

Access DB# 103510

SEARCH REQUEST FORM

Scientific and Technical Information Center

Requester's Full Name: Raymond Alejandro Examiner #: 76895 Date: 09/10/03
Art Unit: 1745 Phone Number 305-33216 Serial Number: 101079603
Mail Box and Bldg/Room Location: C Plaza 3, 8E02 Results Format Preferred (circle): PAPER DISK E-MAIL

If more than one search is submitted, please prioritize searches in order of need.

Please provide a detailed statement of the search topic, and describe as specifically as possible the subject matter to be searched. Include the elected species or structures, keywords, synonyms, acronyms, and registry numbers, and combine with the concept or utility of the invention. Define any terms that may have a special meaning. Give examples or relevant citations, authors, etc, if known. Please attach a copy of the cover sheet, pertinent claims, and abstract.

Title of Invention: Galvanic element having at least one lithium-intercalating electrode

Inventors (please provide full names): Haug et al

Earliest Priority Filing Date: 02/20/02 DE 101 08 695 2/23/01

For Sequence Searches Only Please include all pertinent information (parent, child, divisional, or issued patent numbers) along with the appropriate serial number.

052002 0119376

Please, refer to claims #1-10 (attached copy) for subject matter
to be searched.

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STAFF USE ONLY

Searcher: JC

Type of Search

Vendors and cost where applicable

Searcher Phone #: _____

NA Sequence (#) _____

STN _____

Searcher Location: _____

Structure (#) _____

Qwestel/Orbit _____

Date Searcher Picked Up: 9/11/03

Bibliographic

Dr. Link _____

Date Completed: 9/11/03

Litigation

Lexis/Nexis _____

Searcher Prep & Review Time: 120

Fulltext

Sequence Systems _____

Clerical Prep Time: 120

Patent Family

WWW/Internet _____

Online Time: 120

Other

Other (specify) _____

=> file hca
FILE 'HCA' ENTERED AT 11:59:25 ON 11 SEP 2003
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FILE COVERS 1907 - 4 Sep 2003 VOL 139 ISS 11
FILE LAST UPDATED: 4 Sep 2003 (20030904/ED)

This file contains CAS Registry Numbers for easy and accurate substance identification.

=> d his nofile

(FILE 'HOME' ENTERED AT 10:46:23 ON 11 SEP 2003)

FILE 'HCA' ENTERED AT 10:46:36 ON 11 SEP 2003
E US20020119376/PN

L1 1 SEA ABB=ON PLU=ON US2002119376/PN
D SCAN
SEL L1 RN

FILE 'REGISTRY' ENTERED AT 10:47:07 ON 11 SEP 2003
L2 23 SEA ABB=ON PLU=ON (12190-79-3/BI OR 12597-68-1/BI OR
25038-59-9/BI OR 7429-90-5/BI OR 7439-89-6/BI OR 7439-93-2/BI
OR 7440-02-0/BI OR 7440-22-4/BI OR 7440-31-5/BI OR 7440-32-6/BI
OR 7440-36-0/BI OR 7440-44-0/BI OR 7440-47-3/BI OR 7440-48-4/B
I OR 7440-50-8/BI OR 7440-62-2/BI OR 7440-66-6/BI OR 7440-69-9/
BI OR 7440-74-6/BI OR 7782-42-5/BI OR 84-74-2/BI OR 9011-17-0/B
I OR 95-14-7/BI)

L3 1 SEA ABB=ON PLU=ON L2 AND AYS/CI
D SCAN

L4 1 SEA ABB=ON PLU=ON L2 AND TIS/CI
D SCAN
D SCAN L3
D SCAN L4

L5 21 SEA ABB=ON PLU=ON L2 NOT (L3 OR L4)
D SCAN

L6 15 SEA ABB=ON PLU=ON L5 AND 1-10/M
L7 6 SEA ABB=ON PLU=ON L5 NOT L6
D SCAN

L8 2 SEA ABB=ON PLU=ON L2 AND LITHIUM#
D SCAN
E LITHIUM/CN

L9 1 SEA ABB=ON PLU=ON LITHIUM/CN

FILE 'HCA' ENTERED AT 10:57:13 ON 11 SEP 2003

L10 767351 SEA ABB=ON PLU=ON ANOD? OR CATHOD? OR ELECTRODE?

L11 342051 SEA ABB=ON PLU=ON L9 OR LI OR LITHIUM#

L12 34153 SEA ABB=ON PLU=ON L11(2A)USE?

L13 22091 SEA ABB=ON PLU=ON L10(2A)L11

L14 7006 SEA ABB=ON PLU=ON L13 AND L12

L15 34932 SEA ABB=ON PLU=ON INTERCALAT? OR INTER(W) CALAT?

L16 1513 SEA ABB=ON PLU=ON L14 AND L15

FILE 'LCA' ENTERED AT 11:00:23 ON 11 SEP 2003

L17 15976 SEA ABB=ON PLU=ON ALUMINUM# OR AL OR IRON# OR FE OR NICKEL# OR NI OR SILVER# OR AG OR TIN# OR SN OR TITANIUM# OR TI OR ANTIMONY# OR SB OR CHROMIUM# OR CR OR COBALT# OR CO OR COPPER# OR CU OR VANADIUM# OR V OR BISMUTH# OR BI OR ZINC# OR ZN OR INDIUM# OR IN

L18 7671 SEA ABB=ON PLU=ON FILM? OR THINFILM? OR LAYER? OR OVERLAY? OR OVERLAID? OR LAMIN? OR LAMEL? OR MULTILAYER? OR SHEET? OR LEAF? OR FOIL? OR COAT? OR TOPCOAT? OR OVERCOAT? OR VENEER? OR SHEATH? OR COVER? OR ENVELOP? OR ENCASE? OR ENWRAP? OR OVERSPREAD?

L19 106 SEA ABB=ON PLU=ON CRYSTALLIT?

L20 4562 SEA ABB=ON PLU=ON CRYSTAL?

FILE 'HCA' ENTERED AT 11:06:25 ON 11 SEP 2003

D L1 ALL

FILE 'LCA' ENTERED AT 11:06:48 ON 11 SEP 2003

L21 32336 SEA ABB=ON PLU=ON PRODUC? OR PROD# OR GENERAT? OR MANUF? OR MFR# OR CREAT? OR FORM## OR FORMING# OR FORMAT? OR MAKE# OR MADE# OR MAKIN# OR FABRICAT? OR SYNTHESI? OR PREPAR? OR PREP#

L22 10068 SEA ABB=ON PLU=ON SUBSTRAT? OR SURFACE? OR BASE# OR SUBSTRUCT? OR UNDERSTRUCTUR? OR UNDERLAY?

L23 1804 SEA ABB=ON PLU=ON DEPOSIT?

FILE 'REGISTRY' ENTERED AT 11:18:23 ON 11 SEP 2003

D SCAN L6

D SCAN L7

L24 1 SEA ABB=ON PLU=ON L7 AND 1H-BENZOTRIAZOLE

FILE 'HCA' ENTERED AT 11:19:37 ON 11 SEP 2003

L25 1593650 SEA ABB=ON PLU=ON L6

L26 670378 SEA ABB=ON PLU=ON (L25 OR L17)(2A)USE?

L27 728290 SEA ABB=ON PLU=ON DEPOSIT?

L28 38755 SEA ABB=ON PLU=ON CRYSTALLIT?

L29 1747254 SEA ABB=ON PLU=ON CRYSTAL?

L30 119033 SEA ABB=ON PLU=ON L27(2A)L17

L31 59063 SEA ABB=ON PLU=ON L27(2A)(ALLOY? OR AMALGAM? OR METAL?)

L32 161619 SEA ABB=ON PLU=ON L27(2A)(L18 OR FILM#)

L33 23591 SEA ABB=ON PLU=ON L32 AND L26

L34 90 SEA ABB=ON PLU=ON L14 AND L33

L35 90 SEA ABB=ON PLU=ON L34 AND L18

L36 5 SEA ABB=ON PLU=ON L35 AND L28

L37 15 SEA ABB=ON PLU=ON L35 AND L20

L38 189 SEA ABB=ON PLU=ON CHROMATIZ? OR CHROMATIS?

L39 14247 SEA ABB=ON PLU=ON L24 OR BENZOTRIAZOLE?

L40 0 SEA ABB=ON PLU=ON L35 AND L38

L41 1 SEA ABB=ON PLU=ON L35 AND L39

D SCAN

FILE 'STNGUIDE' ENTERED AT 11:27:18 ON 11 SEP 2003

FILE 'HCA' ENTERED AT 11:31:35 ON 11 SEP 2003

L42	64	SEA ABB=ON	PLU=ON	L34 AND L22
L43	770790	SEA ABB=ON	PLU=ON	CHROMAT?
L44	2	SEA ABB=ON	PLU=ON	L42 AND (L43 OR L39)
L45	12666	SEA ABB=ON	PLU=ON	L31 AND L26
L46	112	SEA ABB=ON	PLU=ON	L45 AND L13
L47	90	SEA ABB=ON	PLU=ON	L34 AND L13
L48	64	SEA ABB=ON	PLU=ON	L47 AND L22
L49	10	SEA ABB=ON	PLU=ON	L46 AND (L19 OR L20)
L50	362	SEA ABB=ON	PLU=ON	L32 AND L13
L51	159	SEA ABB=ON	PLU=ON	L50 AND L26
L52	111	SEA ABB=ON	PLU=ON	L51 AND L22
L53	2	SEA ABB=ON	PLU=ON	L52 AND L43
L54	0	SEA ABB=ON	PLU=ON	L52 AND L39
L55	42206	SEA ABB=ON	PLU=ON	?TRIAZOLE?
L56	0	SEA ABB=ON	PLU=ON	L52 AND L55
L57	15526	SEA ABB=ON	PLU=ON	L52 AND CORROS? OR CORROD?
L58	1	SEA ABB=ON	PLU=ON	L52 AND (CORROS? OR CORROD?)
L59	24	SEA ABB=ON	PLU=ON	L52 AND (L19 OR L20)
L60	4	SEA ABB=ON	PLU=ON	L52 AND L19
L61	9	SEA ABB=ON	PLU=ON	L36 OR L41 OR L53 OR L58 OR L60
L62	6	SEA ABB=ON	PLU=ON	L61 AND L19
L63	3	SEA ABB=ON	PLU=ON	L59 AND L15
L64	19	SEA ABB=ON	PLU=ON	L52 AND L15
L65	1	SEA ABB=ON	PLU=ON	L64 AND L19
L66	6	SEA ABB=ON	PLU=ON	L62 OR L65
L67	19	SEA ABB=ON	PLU=ON	L64 AND L13
L68	41	SEA ABB=ON	PLU=ON	L37 OR L49 OR L64 OR L67
L69	35	SEA ABB=ON	PLU=ON	L68 NOT L61
L70	34	SEA ABB=ON	PLU=ON	L69 AND 1907-2002/PY, PRY
L71	31	SEA ABB=ON	PLU=ON	L69 AND 1907-2001/PY, PRY
L72	0	SEA ABB=ON	PLU=ON	L71 NOT L70
L73	3	SEA ABB=ON	PLU=ON	L70 NOT L71

FILE 'JAPIO' ENTERED AT 11:42:52 ON 11 SEP 2003

L74	461940	SEA ABB=ON	PLU=ON	ELECTROD? OR ANOD? OR CATHOD?
L75	28174	SEA ABB=ON	PLU=ON	LI OR LITHIUM#
L76	4620	SEA ABB=ON	PLU=ON	L74(3A)L75
L77	84	SEA ABB=ON	PLU=ON	L76 AND L15
L78	3	SEA ABB=ON	PLU=ON	L77 AND L19
L79	76	SEA ABB=ON	PLU=ON	L77 AND L17
L80	37660	SEA ABB=ON	PLU=ON	L23(2A)(L17 OR METAL? OR ALLOY? OR STEEL?)
L81	3	SEA ABB=ON	PLU=ON	L77 AND L80
L82	93	SEA ABB=ON	PLU=ON	L76 AND L80
L83	50	SEA ABB=ON	PLU=ON	L82 AND L22
L84	24	SEA ABB=ON	PLU=ON	(L77 OR L79 OR L82 OR L83) AND L20
L85	30032	SEA ABB=ON	PLU=ON	H01M004?/IC
L86	125	SEA ABB=ON	PLU=ON	(L77 OR L79 OR L82 OR L83) AND L85
L87	21	SEA ABB=ON	PLU=ON	L86 AND L20
L88	6	SEA ABB=ON	PLU=ON	(L78 OR L81) AND L86
L89	18	SEA ABB=ON	PLU=ON	L87 NOT L88

FILE 'WPIX' ENTERED AT 11:51:01 ON 11 SEP 2003

L90	592465	SEA ABB=ON	PLU=ON	L74 OR ELECTRODE#
L91	61136	SEA ABB=ON	PLU=ON	L75 OR LI
L92	6900	SEA ABB=ON	PLU=ON	L90(2A)L91
L93	287	SEA ABB=ON	PLU=ON	L92 AND L15

L94	9445	SEA ABB=ON	PLU=ON	L90 (4A) L91
L95	373	SEA ABB=ON	PLU=ON	L94 AND L15
L96	43537	SEA ABB=ON	PLU=ON	L23 (2A) (L17 OR METAL? OR ALLOY? OR STEEL?)
L97	93	SEA ABB=ON	PLU=ON	L94 AND L96
L98	57	SEA ABB=ON	PLU=ON	L97 AND L22
L99	36328	SEA ABB=ON	PLU=ON	H01M004?/IC
L100	39	SEA ABB=ON	PLU=ON	L98 AND L99
L101	1	SEA ABB=ON	PLU=ON	L100 AND L19
L102	6	SEA ABB=ON	PLU=ON	L100 AND L20
L103	6828	SEA ABB=ON	PLU=ON	CHROMATIZ? OR CHROMATIS? OR BENZOTRIAZOL?
L104	1	SEA ABB=ON	PLU=ON	L100 AND L103
L105	2	SEA ABB=ON	PLU=ON	L100 AND CORROS?
L106	72679	SEA ABB=ON	PLU=ON	L23 (2A) (L18 OR FILM#)
L107	21	SEA ABB=ON	PLU=ON	L100 AND L106
L108	7	SEA ABB=ON	PLU=ON	L101 OR L102 OR L104 OR L105
L109	18	SEA ABB=ON	PLU=ON	L107 NOT L108

=> d L66 1-6 cbib abs hitind hitrn

L66 ANSWER 1 OF 6 HCA COPYRIGHT 2003 ACS on STN

138:128834 Enhancement of luminance and life in electroluminescent devices.

Beatty, Paul Hanlon James (Lite Array Inc., USA). U.S. Pat. Appl. Publ. US 2003020397 A1 20030130, 15 pp. (English). CODEN: USXXCO.

APPLICATION: US 2002-185749 20020628. PRIORITY: US 2001-PV301995 20010628.

AB An electroluminescent device for improving luminance by reducing light trapping caused by total internal reflection is described comprising a 1st electrode **layer**, a 2nd electrode **layer**, and a light-emitting **layer** disposed between the 1st and 2nd electrode **layers**, wherein the light-emitting **layer** includes a polycryst. or amorphous material from which light can be trapped by total internal reflection until reaching a region of **crystallite** capable of scattering light. An electroluminescent device having a plurality of **layers deposited** on a viewing **surface**, is also described which comprise a light-emitting means wherein the light-emitting means includes the light-scattering means which is at least one **crystallite** within the light-emitting means; a light-scattering means for increasing a luminance of the device, wherein the light-scattering means is a gap within a **layer** of the device wherein the gap includes two sidewalls positioned at an angle; and a conducting means for establishing a voltage across the light-emitting means, wherein the conducting means includes the light-scattering means which is a roughened **surface** of a **layer** within the device. Methods of fabricating the devices are also described.

IC ICM H05B033-22

NCL 313503000

CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

Section cross-reference(s): 74, 76

IT 123847-85-8, NPD

RL: DEV (Device component use); USES (Uses)
(NPD, hole transport **layer**; electroluminescent device having improved luminance)

IT. 37271-44-6

RL: DEV (Device component use); USES (Uses)

(cathode layer; electroluminescent device having improved luminance)

IT 132614-63-2, Silicon nitride oxide (SiNO)
RL: DEV (Device component use); USES (Uses)
(dielec. layer; electroluminescent device having improved luminance)

IT 7440-47-3, Chromium, uses
RL: DEV (Device component use); USES (Uses)
(electrode with CrO; electroluminescent device having improved luminance)

IT 7429-90-5, Aluminum, uses 7789-24-4,
Lithium fluoride, uses 50926-11-9, Indium tin oxide
RL: DEV (Device component use); USES (Uses)
(electrode; electroluminescent device having improved luminance)

IT 147-14-8, Copper phthalocyanine
RL: DEV (Device component use); USES (Uses)
(hole injection layer; electroluminescent device having improved luminance)

IT 1314-98-3, Zinc sulfide (ZnS), uses
2085-33-8, AlQ3
RL: DEV (Device component use); USES (Uses)
(luminescent layer; electroluminescent device having improved luminance)

IT 7440-47-3, Chromium, uses
RL: DEV (Device component use); USES (Uses)
(electrode with CrO; electroluminescent device having improved luminance)

IT 7429-90-5, Aluminum, uses
RL: DEV (Device component use); USES (Uses)
(electrode; electroluminescent device having improved luminance)

L66 ANSWER 2 OF 6 HCA COPYRIGHT 2003 ACS on STN

137:203949 Galvanic element with a lithium intercalating electrode. Haug, Peter; Birke, Peter; Holl, Konrad; Ilic, Dejan (Microbatterie G.m.b.H., Germany). Eur. Pat. Appl. EP 1235286 A2 20020828, 6 pp. DESIGNATED STATES: R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR. (German). CODEN: EPXXDW. APPLICATION: EP 2002-1556 20020123. PRIORITY: DE 2001-10108695 20010223.

AB This galvanic element has a lithium intercalating electrode with electrochem. active material on a foil -like metallic conductor. The conductor is coated with electrochem. deposited crystals of another metal or of the same metal as the conductor. This coating increases the contact area and reduces the transition resistance of the active material. The metal support may be Al, Cu, V, Ti, Cr, Fe, Ni, Co, alloys of these metals, or a stainless steel. The deposited metal may be Cu, V, Ti, Cr, Fe, Ni, Co, Zn, Sn, In, Sb, Bi, Ag or alloys of these metals. The crystal size of the electrochem. deposited material is 1-10 .mu.m and there is preferably only 3 deposited cryst. layers.

IC ICM H01M004-02
ICS H01M004-66

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
ST battery anode cathode lithium intercalating electrode metal crystallite

IT Battery anodes
Battery cathodes
Electric capacitance

Film electrodes
Grain size
Laminated materials
(galvanic element with a lithium intercalating electrode)

IT Alloys, uses
Polyesters, uses
RL: DEV (Device component use); USES (Uses)
(galvanic element with a lithium intercalating electrode)

IT Chromating
(treatment of electrode; galvanic element with a lithium intercalating electrode)

IT 7782-42-5, Graphite, uses
RL: DEV (Device component use); USES (Uses)
(MCMB or KS 6; galvanic element with a lithium intercalating electrode)

IT 9011-17-0, Powerflex
RL: DEV (Device component use); USES (Uses)
(Powerflex; galvanic element with a lithium intercalating electrode)

IT 7440-44-0, Super P, uses
RL: DEV (Device component use); USES (Uses)
(activated; galvanic element with a lithium intercalating electrode)

IT 95-14-7, 1H-Benzotriazole
RL: DEV (Device component use); USES (Uses)
(electrode coating; galvanic element with a lithium intercalating electrode)

IT 84-74-2, Dibutyl phthalate 7429-90-5, Aluminum,
uses 7439-89-6, Iron, uses
7439-93-2, Lithium, uses 7440-02-0,
Nickel, uses 7440-22-4, Silver,
uses 7440-31-5, Tin, uses
7440-32-6, Titanium, uses 7440-36-0,
Antimony, uses 7440-47-3, Chromium,
uses 7440-48-4, Cobalt, uses
7440-50-8, Copper, uses 7440-62-2,
Vanadium, uses 7440-66-6, Zinc,
uses 7440-69-9, Bismuth, uses
7440-74-6, Indium, uses 12190-79-3, Cobalt
lithium oxide(CoLiO₂) 12597-68-1, Stainless steel, uses 25038-59-9,
Mylar, uses
RL: DEV (Device component use); USES (Uses)
(galvanic element with a lithium intercalating electrode)

IT 95-14-7, 1H-Benzotriazole
RL: DEV (Device component use); USES (Uses)
(electrode coating; galvanic element with a lithium intercalating electrode)

IT 7429-90-5, Aluminum, uses 7439-89-6,
Iron, uses 7439-93-2, Lithium,
uses 7440-02-0, Nickel, uses
7440-22-4, Silver, uses 7440-31-5,
Tin, uses 7440-32-6, Titanium,
uses 7440-36-0, Antimony, uses
7440-47-3, Chromium, uses 7440-48-4,
Cobalt, uses 7440-50-8, Copper,
uses 7440-62-2, Vanadium, uses
7440-66-6, Zinc, uses 7440-69-9,

Bismuth, uses 7440-74-6, Indium, uses
RL: DEV (Device component use); USES (Uses)
(galvanic element with a lithium intercalating electrode)

L66 ANSWER 3 OF 6 HCA COPYRIGHT 2003 ACS on STN
136:376315 Electrodeposited tin coating as negative electrode material for lithium-ion battery in room temperature molten salt. Fung, Y. S.; Zhu, D. R. (Department of Chemistry, The University of Hong Kong, Hong Kong, Peop. Rep. China). Journal of the Electrochemical Society, 149(3), A319-A324 (English) 2002. CODEN: JESOAN. ISSN: 0013-4651. Publisher: Electrochemical Society.

AB A new room temp. molten salt (RTMS) [1-methyl-3-ethyylimidazolium/AlCl₃/SnCl₂ (3:2:0.5)] was developed for depositing tin on a copper electrode. Different tin **crystallites** were deposited at different temps., giving widely different performances of the assembled lithium cell [Sn (Cu)/LiCl buffered MEI₂-AlCl₃ RTMS/lithium]. Tin **film deposited** at 50.degree. or higher gave a more desirable crystal structure and an improved performance than **films** obtained at lower temps. Both cyclic voltammetry and galvanostatic cycling show the formation of three major lithium-tin alloy phases corresponding to the phase transition of LiSn/Li₇Sn₃, Li₁₃Sn₅/Li₇Sn₂, and Li₇Sn₂/Li₂₂Sn₅. Increases in the charging and discharging capacities were found with the deposition of higher lithium-rich tin alloys, though at the degrdn. of the irreversible capacity at the first cycle. The discharging capacity decreased rapidly, producing loose, expanded, and irregular **crystallites** upon cycling at a high c.d. (cd) (1.0 mA/cm²). However, an av. capacity of 140 mAh/g, coulombic efficiency around 85%, and more than 200 cycles were obtained at a low cd (0.4 mA/cm²). The improvement is attributed to the deposition of small and regular tin **crystallites** that allows reversible insertion and removal of lithium from a more stable crystal structure without a significant vol. change during cycling.

CC 72-8 (Electrochemistry)

Section cross-reference(s): 52, 56

ST tin **electrodeposit** lithium battery **electrode**
room temp molten salt

IT Battery electrodes

Coating materials

Secondary batteries

(electrodeposited tin **coating** as neg. **electrode**
material for lithium-ion battery in room temp. molten salt)

IT Salts, **uses**

RL: NUU (Other use, unclassified); USES (Uses)
(molten; electrodeposited tin **coating** as neg.
electrode material for lithium-ion battery in room
temp. molten salt)

IT Electric capacitance

(of tin **coated** electrodes in 1-methyl-3-
ethyylimidazolium/AlCl₃/SnCl₂ electrolyte buffered with LiCl)

IT Electrodeposition

(of tin **coating** as neg. **electrode** material for
lithium-ion battery in room temp. molten salt)

IT Surface structure

(of tin **coating** as neg. **electrode** material for
lithium-ion battery in room temp. molten salt during
charge-discharge cycling)

IT 7447-41-8, Lithium chloride, **uses**

RL: NUU (Other use, unclassified); USES (Uses)

(cyclic voltammetry of copper pure and tin **coated** electrodes
in 1-methyl-3-ethyliimidazolium/AlCl₃/SnCl₂ electrolyte buffered with)

IT 65039-03-4, 1-Methyl-3-ethyliimidazolium
RL: NUU (Other use, unclassified); USES (Uses)
(electrodeposited tin **coating** as neg. **electrode**
material for lithium-ion battery in room temp. molten salt)

IT 7446-70-0, Aluminum chloride, **uses**
RL: NUU (Other use, unclassified); USES (Uses)
(electrodeposited tin **coating** as neg.
electrode material for lithium-ion battery in room
temp. molten salt contg.)

IT 7439-93-2, Lithium, **uses**
RL: CPS (Chemical process); DEV (Device component use); PEP (Physical,
engineering or chemical process); RCT (Reactant); PROC (Process); RACT
(Reactant or reagent); USES (Uses)
(formation with **tin** electrodeposited on copper in room temp.
molten salt lithium cell)

IT 7772-99-8, Tin dichloride, reactions
RL: CPS (Chemical process); PEP (Physical, engineering or chemical
process); RCT (Reactant); PROC (Process); RACT (Reactant or reagent)
(of tin **coating** as neg. **electrode** material for
lithium-ion battery in room temp. molten salt contg.)

IT 7439-93-2, Lithium, **uses**
RL: CPS (Chemical process); DEV (Device component use); PEP (Physical,
engineering or chemical process); RCT (Reactant); PROC (Process); RACT
(Reactant or reagent); USES (Uses)
(formation with **tin** electrodeposited on copper in room temp.
molten salt lithium cell)

L66 ANSWER 4 OF 6 HCA COPYRIGHT 2003 ACS on STN

127:7048 Ultrahigh reversible capacity carbon-lithium **anode**
material. Yazami, R.; Deschamps, M. (LIESG, St. Martin-d'Heres, 38402,
Fr.). Progress in Batteries & Battery Materials, 15, 161-167 (English)
1996. CODEN: PBBMEF. Publisher: ITE-JEC Press.

AB We have used a soft type carbon heat treated at a temp. below 1000.degree.
in polymer electrolyte-based Li batteries. An unexpected
ultrahigh capacity up to 1900 mA-h/g is obtained. A method involving the
epitaxial **multilayer deposit** on the external a,b
layers and on the edges of the carbon **crystallites** is
proposed to describe these results.

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST battery carbon **lithium anode** material

IT Coal tar pitch

RL: RCT (Reactant); RACT (Reactant or reagent)
(carbon precursor; ultrahigh reversible capacity carbon-lithium
anode materials for batteries)

IT Battery anodes
(ultrahigh reversible capacity carbon-lithium **anode**
materials for batteries)

IT 7439-93-2, Lithium, **uses**

RL: DEV (Device component use); USES (Uses)
(carbon **intercalated** with; ultrahigh reversible capacity
carbon-lithium **anode** materials for batteries)

IT 7440-44-0, Carbon, **uses**

RL: DEV (Device component use); USES (Uses)
(lithium-**intercalated**; ultrahigh reversible
capacity carbon-lithium **anode** materials for
batteries)

IT 39448-96-9, Graphite-lithium

RL: DEV (Device component use); USES (Uses)

(ultrahigh reversible capacity carbon-lithium anode materials for batteries)

IT 7439-93-2, Lithium, uses

RL: DEV (Device component use); USES (Uses)
(carbon intercalated with; ultrahigh reversible capacity carbon-lithium anode materials for batteries)

L66 ANSWER 5 OF 6 HCA COPYRIGHT 2003 ACS on STN

125:70186 Molten salt electrolytes for electrodeposition of CdTe films

. Raza, Arif; Engelken, Robert; Kemp, Brandon; Siddiqui, Arees; Mustafa, Omer (Department Engineering, Arkansas State University, State University, AR, 72467, USA). Proceedings of the Arkansas Academy of Science, 49, 143-148 (English) 1995. CODEN: AKASAO. ISSN: 0097-4374. Publisher: Arkansas Academy of Science.

AB The authors report preliminary study of several molten salt electrolytes contg. CdCl₂ and TeCl₄ for the electrodeposition of CdTe films at temps. well above (>250.degree.) those used with aq. and org. electrolytes. These high temps. have potential to dramatically increase the **crystallite** size (C.Poole, et al., 1994), as is important for optoelectronic device applications of CdTe, a leading II-VI semiconductor. This paper will survey the results obtained with electrolytes such as B₂O₃/HBO₂ (m.p. .apprxeq. 230.degree.), NaCH₃COO (m.p. .apprxeq. 324.degree.), ZnCl₂ (m.p. .apprxeq. 283.degree.), and LiCl/KCl (m.p. .apprxeq. 350.degree.), with an emphasis on the latter two. Key material to be presented includes (1) voltammetric data for the solns., (2) x-ray diffractometry data for **deposited films**, (3) a discussion of the numerous practical problems assocd. with high temp. electrochem., esp. in corrosive, volatile systems, and (4) emphasis of the value of an operationally feasible high temp. plating system to the com. viability of electrodeposited semiconductor **films**.

CC 72-5 (Electrochemistry)

Section cross-reference(s): 76

ST molten salt electrolyte electrodeposition cadmium telluride; lithium potassium chloride **electrodeposition** cadmium telluride

IT Electrodeposition and Electroplating

(molten salt electrolytes for electrodeposition of CdTe films)

IT 127-09-3, Sodium acetate 1303-86-2, Boron oxide b₂o₃, uses 7447-40-7, Potassium chloride (KCl), uses 7447-41-8, Lithium chloride (LiCl), uses 7646-85-7, Zinc chloride, uses 13460-50-9, Boric acid hbo₂

RL: NUU (Other use, unclassified); PRP (Properties); USES (Uses)
(molten salt electrolytes contg. CdCl₂ and TeCl₄ for electrodeposition of CdTe films)

IT 10026-07-0, Tellurium chloride (TeCl₄) 10108-64-2, Cadmium chloride (CdCl₂)

RL: RCT (Reactant); RACT (Reactant or reagent)
(molten salt electrolytes contg. CdCl₂ and TeCl₄ for electrodeposition of CdTe films)

IT 1306-25-8, Cadmium telluride (CdTe), properties

RL: PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process)
(molten salt electrolytes for electrodeposition of CdTe films)

L66 ANSWER 6 OF 6 HCA COPYRIGHT 2003 ACS on STN

120:176368 Reversible electrodeposition of bismuth thin films for flat panel display applications. Howard, Bruce M.; Ziegler, John P.; McKee, Max;

Tornberg, Neal; Caudy, Kim (McDonnell Douglas Technol. Inc., San Diego, CA, 92037, USA). Proceedings - Electrochemical Society, 93-26(Proceedings of the Symposium on Electrochemically Deposited Thin Films, 1993), 353-61 (English) 1993. CODEN: PESODO. ISSN: 0161-6374.

AB A new type of electrochromic display technol. based on reversible electrodeposition is being investigated for possible use in military display systems. The reversible electrodeposition of thin metal films of bismuth was characterized in aq. soln. using traditional 3-electrode electrochem. cells and solid state (gel) electrochem. cells. The solid state cell structure consisted of transparent conducting working electrode/bismuth-contg. gel electrolyte/porous carbon plastic counter electrode. Application of a DC bias (-1.5 V) to the working electrode resulted in the deposition of thin bismuth films and a resulting change in optical d. A reverse bias (+1.5 V) was applied to remove the bismuth deposit (cell erasure). By varying the thickness of the bismuth deposit between 0 and 6 .mu.m the visible reflectance (gray shade) of the device could be controlled. Thin film bismuth deposition was initiated by monolayer (UPD) formation followed by bismuth island crystallite formation and growth. The morphol. of the bismuth deposit was found to have a large, irregular surface area.

CC 72-8 (Electrochemistry)

Section cross-reference(s): 74

ST bismuth reversible electrodeposition electrochromic display device; surface structure reflection spectrum bismuth electrodeposit

IT Surface structure

(of bismuth electrodeposits, from gel media)

IT 7447-39-4, Copper dichloride, uses 7550-35-8,
Lithium bromide 7787-60-2, Bismuth trichloride 9004-62-0,
Hydroxyethylcellulose 13463-67-7, Titanium oxide, uses

RL: USES (Uses)

(electrodeposition of bismuth from gel media
contg., for electrochromic display devices)

IT 7440-69-9, Bismuth, uses

RL: PEP (Physical, engineering or chemical process); PROC (Process)
(reversible electrodeposition of, for electrochromic display devices)

IT 7440-69-9, Bismuth, uses

RL: PEP (Physical, engineering or chemical process); PROC (Process)
(reversible electrodeposition of, for electrochromic display devices)

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L63 ANSWER 1 OF 3 HCA COPYRIGHT 2003 ACS on STN

127:7048 Ultrahigh reversible capacity carbon-lithium anode material. Yazami, R.; Deschamps, M. (LIESG, St. Martin-d'Heres, 38402, Fr.). Progress in Batteries & Battery Materials, 15, 161-167 (English) 1996. CODEN: PBBMEF. Publisher: ITE-JEC Press.

AB We have used a soft type carbon heat treated at a temp. below 1000.degree. in polymer electrolyte-based Li batteries. An unexpected ultrahigh capacity up to 1900 mA-h/g is obtained. A method involving the epitaxial multilayer deposit on the external a,b layers and on the edges of the carbon crystallites is proposed to describe these results.

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST battery carbon lithium anode material

IT Coal tar pitch

RL: RCT (Reactant); RACT (Reactant or reagent)

(carbon precursor; ultrahigh reversible capacity carbon-lithium anode materials for batteries)

IT Battery anodes

(ultrahigh reversible capacity carbon-lithium anode materials for batteries)

IT 7439-93-2, Lithium, uses
RL: DEV (Device component use); USES (Uses)
(carbon intercalated with; ultrahigh reversible capacity carbon-lithium anode materials for batteries)

IT 7440-44-0, Carbon, uses
RL: DEV (Device component use); USES (Uses)
(lithium-intercalated; ultrahigh reversible capacity carbon-lithium anode materials for batteries)

IT 39448-96-9, Graphite-lithium
RL: DEV (Device component use); USES (Uses)
(ultrahigh reversible capacity carbon-lithium anode materials for batteries)

IT 7439-93-2, Lithium, uses
RL: DEV (Device component use); USES (Uses)
(carbon intercalated with; ultrahigh reversible capacity carbon-lithium anode materials for batteries)

L63 ANSWER 2 OF 3 HCA COPYRIGHT 2003 ACS on STN

123:118408 Vanadium pentoxide gels from liquid crystals to lithium batteries. Livage, J.; Baffier, N.; Pereira-Ramos, J. P.; Davidson, P. (Chim. Matiere Condensee, Univ. P. M. Curie, Paris, 75252, Fr.). Materials Research Society Symposium Proceedings, 369(Solid State Ionics IV), 179-90 (English) 1995. CODEN: MRSPDH. ISSN: 0272-9172. Publisher: Materials Research Society.

AB Vanadium pentoxide gels V₂O₅.nH₂O are formed via the condensation of vanadic acid in aq. solns. They exhibit both ionic and electronic cond. and could therefore be used as cathode materials in lithium batteries or electrochromic display devices. The polymn. process leads to ribbon-like vanadium pentoxide particles. In a given range of concn., sols and gels exhibit a homogeneous lyotropic nematic phase in which the ribbons align in the same direction. Ordered fluid phases are thus obtained leading to oriented films when deposited onto flat substrates. Moreover, mixed oxides M_xV₂O₅ (M = Na⁺, K⁺, Ba²⁺, Al³⁺, Fe³⁺, ...) exhibiting some preferred orientation are obtained via ion exchange. These compds. exhibit improved electrochem. properties (specific capacity, cycling properties) compared to usual mixed oxides prep'd. via solid state reactions.

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 72, 74

ST lithium battery cathode vanadium pentoxide gel;
electrochromic display device vanadium pentoxide gel

IT Cathodes
(battery, vanadium pentoxide gels from liq. crystals to lithium batteries)

IT Inclusion reaction
(intercalation, electrochem., electrochem. insertion of lithium in vanadium pentoxide gels for lithium batteries)

IT 1314-62-1, Vanadium pentoxide, uses
RL: DEV (Device component use); USES (Uses)
(vanadium pentoxide gels from liq. crystals to lithium batteries)

L63 ANSWER 3 OF 3 HCA COPYRIGHT 2003 ACS on STN

110:196330 Behavior of the negative and positive electrodes in an aprotic secondary lithium cell. Wiesener, K.; Eckoldt, U.; Muller, J.; Schneider, W.; Rahner, D. (Dep. Chem., Dresden Univ. Technol., Dresden, 8027, Ger. Dem. Rep.). Bulletin of Electrochemistry, 5(1), 23-7 (English) 1989.. CODEN: BUELE6. ISSN: 0256-1654.

AB The performance of **Li anodes** was affected by Li deposition and dissoln. i.e. the formation and removal of **surface layers** related to electrolyte and side reactions, as indicated by studies by Li and **Li-Al anodes** in org. solvent electrolyte. The cycling efficiency of V205 cathodes was detd. by **cryst. structure changes**; .ltoreq. 3.1 V, the cycling reaction (i.e. Li **intercalation**) was reversible, but when the discharge voltage reached the 2nd plateau, .ltoreq.2.0 V, irreversible lattice changes occurred and the cycling efficiency deteriorated.

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 72

ST **lithium anode surface layer cycling**;
vanadium oxide cathode cycling performance; intercalation
lithium vanadium oxide reversibility; battery intercalation
lithium vanadium oxide

IT Electric resistance
(of **lithium anode surface layer**, cycling efficiency in relation to)

IT Electrolytic polarization
(of lithium, **surface layer deposition**
-dissoln. during, cycling efficiency in relation to)

IT Anodes
(battery, **lithium**, cycling efficiency of, **surface layer formation-dissoln. effect on**)

IT Cathodes
(battery, vanadium pentoxide, phase changes during cycling of, lithium **intercalation effect on**)

IT Inclusion reaction
(**intercalation**, electrochem., of lithium, by vanadium pentoxide cathode, phase change and cycling efficiency in relation to)

IT 7439-93-2, Lithium, **uses** and miscellaneous
RL: USES (Uses)
(anodes, cycling efficiency of, **surface layer formation-dissoln. effect on**)

IT 1314-62-1, Vanadium oxide (V205), **uses** and miscellaneous
RL: USES (Uses)
(cathodes, phase changes during cycling of, lithium **intercalation effect on**)

IT 7429-90-5, Aluminum, **uses** and miscellaneous
7440-02-0, Nickel, **uses** and miscellaneous
RL: USES (Uses)
(electrodes, **lithium surface layer on**,
anode cycling efficiency in relation to)

IT 96-47-9, 2-Methyltetrahydrofuran 109-99-9, THF, uses and miscellaneous
RL: USES (Uses)
(electrolytes contg. lithium salt and, **lithium anode cycling characteristics in**)

IT 14727-56-1, Decaline
RL: USES (Uses)
(electrolytes contg., lithium salt-org. solvent, **lithium anode potential in relation to**)

IT 7791-03-9, Lithium perchlorate (LiClO₄) 21324-40-3, Lithium hexafluorophosphate (LiPF₆) 29935-35-1, Lithium hexafluoroarsenate (LiAsF₆)
RL: USES (Uses)
(electrolytes of org. solvent and, **lithium anode cycling characteristics in**)

IT 7439-93-2, Lithium, **uses** and miscellaneous
RL: USES (Uses)

(anodes, cycling efficiency of, surface layer formation-dissoln. effect on)

IT 7429-90-5, Aluminum, uses and miscellaneous
7440-02-0, Nickel, uses and miscellaneous
RL: USES (Uses)
(electrodes, lithium surface layer on, anode cycling efficiency in relation to)

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L113 ANSWER 1 OF 11 HCA COPYRIGHT 2003 ACS on STN
137:339939 Secondary lithium battery anode and the battery. Fujimoto, Hiroyuki; Mita, Hiroko; Okamoto, Takashi; Fujiwara, Toyoki; Iyori, Masahiro; Kamino, Maruo (Sanyo Electric Co., Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 2002313319 A2 20021025, 9 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 2001-110149 20010409.

AB The anode has a thin Li-intercalating active mass layer deposited on a current collector having a corrugated surface; where the active mass layer in its thickness direction has gaps among concavities of the collector surface. Preferable, the gap width is .1toreq.10 um, the active mass layer is an amorphous silicon film and the collector is formed by depositing metal particles on a rough surface treated metal foil. The battery has the above anode, a cathode and a nonaq. electrolyte.

IC ICM H01M004-02
ICS H01M004-64; H01M004-70; H01M010-40

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST Secondary lithium battery silicon anode active mass gap structure

IT Battery anodes
(Anodes contg. Si films with small gaps deposited on Cu collectors for secondary lithium batteries)

IT 7440-50-8, Copper, uses
RL: DEV (Device component use); USES (Uses)
(Anodes contg. Si films with small gaps deposited on Cu collectors for secondary lithium batteries)

IT 7440-21-3, Silicon, uses
RL: DEV (Device component use); USES (Uses)
(anodes contg. Si films with small gaps deposited on Cu collectors for secondary lithium batteries)

IT 7440-50-8, Copper, uses
RL: DEV (Device component use); USES (Uses)
(Anodes contg. Si films with small gaps deposited on Cu collectors for secondary lithium batteries)

L113 ANSWER 2 OF 11 HCA COPYRIGHT 2003 ACS on STN
137:143087 Electrode or separator having porous lithium film, their manufacture, and secondary lithium battery using them. Hashimoto, Tsutomu; Takano, Akemi; Kodama, Masaru; Takano, Takayuki; Tajima, Hidehiko (Mitsubishi Heavy Industries, Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 2002231221 A2 20020816, 11 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 2001-25443 20010201.

AB The claimed electrode, for a secondary Li battery equipped with a Li mixed oxide cathode and a Li-intercalating anode, has a porous Li film on a surface of the cathode and/or the anode. The claimed separator has a porous Li film having uneven surface with av. height 0.1-30 .mu.m and (av. width)/(av. height) ratio 1-10 on a surface of a synthetic resin film. The claimed battery is equipped with

the above electrode or the separator. The claimed process comprises forming the Li film by vacuum deposition, ion plating, or sputtering at 20-150.degree., .1toreq.1 times. 10-2 Torr, and deposition rate 1-30 nm/s on an electrode substrate or a synthetic resin film. The battery provides high discharge capacity d.

IC ICM H01M004-02
ICS H01M002-18; H01M004-04; H01M004-58; H01M010-40
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
ST lithium porous film deposition battery
electrode separator
IT Battery anodes
 Battery cathodes
 Secondary battery separators
 Sputtering
 (electrode or separator having porous lithium film manufd. by deposition for battery)
IT Vapor deposition process
 (ion plating; electrode or separator having porous lithium film manufd. by deposition for battery)
IT Secondary batteries
 (lithium; electrode or separator having porous lithium film manufd. by deposition for battery)
IT Vapor deposition process
 (vacuum; electrode or separator having porous lithium film manufd. by deposition for battery)
IT 7440-44-0, Carbon, uses
RL: DEV (Device component use); USES (Uses)
 (anode; electrode or separator having porous lithium film manufd. by deposition for battery)
IT 12031-65-1, Lithium nickel oxide (LiNiO₂) 12057-17-9, Lithium manganese oxide (LiMn₂O₄) 12190-79-3, Cobalt lithium oxide (CoLiO₂)
RL: DEV (Device component use); USES (Uses)
 (cathode; electrode or separator having porous lithium film manufd. by deposition for battery)
IT 7439-93-2, Lithium, uses
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)
 (electrode or separator having porous lithium film manufd. by deposition for battery)
IT 9003-07-0, Polypropylene
RL: DEV (Device component use); USES (Uses)
 (separator; electrode or separator having porous lithium film manufd. by deposition for battery)
IT 7439-93-2, Lithium, uses
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)
 (electrode or separator having porous lithium film manufd. by deposition for battery)

L113 ANSWER 3 OF 11 HCA COPYRIGHT 2003 ACS on STN

136:265842 Composite electrode material, its manufacture, and secondary battery using the material. Yamada, Masayuki; Miyamoto, Miwa; Yokoyama, Eri; Koyama, Toshihiro; Saibara, Shoji; Aoyama, Shigeo (Hitachi Maxell Ltd., Japan). PCT Int. Appl. WO 2002027825 A1 20020404, 23 pp.
DESIGNATED STATES: W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PH, PL, PT, RO, RU, SD,

SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG, TR. (Japanese). CODEN: PIXXD2. APPLICATION: WO 2001-JP8348 20010926. PRIORITY: JP 2000-296478 20000928; JP 2001-253239 20010823.

AB The composite electrode material has a 0.01-30 .mu.m Li transition metal nitride cores coated with a Li **intercalating** or Li⁺ conducting material, other than Li transition metal nitride, on their **surface** and is prep'd. by vapor phase deposition method to form the coating. The transition metal in the nitride is selected from Co, Cu, Fe, and Ni; the Li **intercalating** material is a carbonaceous material or a metal or its oxide or nitride. A secondary Li **battery** uses the material for cathode and/or anode.

IC ICM H01M004-58

ICS H01M004-02; H01M010-40; H01G009-00

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST **secondary lithium battery electrode**

lithium transition metal nitride; electrode

lithium transition metal nitride vapor phase coating

IT Vapor deposition process

(chem.; CVD **deposition of coating** materials on
lithium transition metal nitride for **secondary lithium**
battery electrodes)

IT **Battery anodes**

(**lithium intercalating** and lithium conducting
material coated lithium transition metal nitride for **secondary**
lithium battery electrodes)

IT Carbonaceous materials (technological products)

RL: DEV (Device component use); PEP (Physical, engineering or chemical
process); PROC (Process); USES (Uses)
(**lithium intercalating** and lithium conducting material coated
lithium transition metal nitride for **secondary lithium**
battery electrodes)

IT Sputtering

(sputtering **deposition of coating** materials on
lithium transition metal nitride for **secondary lithium**
battery electrodes)

IT Vapor deposition process

(vapor phase **deposition of coating** materials on
lithium transition metal nitride for **secondary lithium**
battery electrodes)

IT 174421-80-8P, Cobalt lithium nitride (Co0.4Li₂.6N)

RL: DEV (Device component use); IMF (Industrial manufacture); PEP
(Physical, engineering or chemical process); PYP (Physical process); PREP
(Preparation); PROC (Process); USES (Uses)
(**lithium intercalating** and lithium conducting material coated
lithium transition metal nitride for **secondary lithium**
battery electrodes)

IT 1308-80-1, Copper nitride (Cu₃N) 7429-90-5, **Aluminum**,

uses 10377-52-3, Lithium phosphate 63985-45-5, Lithium

orthosilicate 113443-18-8, Silicon oxide (SiO)

RL: DEV (Device component use); PEP (Physical, engineering or chemical
process); PROC (Process); USES (Uses)

(**lithium intercalating** and lithium conducting material coated
lithium transition metal nitride for **secondary lithium**
battery electrodes)

IT **7429-90-5, Aluminum, uses**

RL: DEV (Device component use); PEP (Physical, engineering or chemical
process); PROC (Process); USES (Uses)

(lithium intercalating and lithium conducting material coated lithium transition metal nitride for secondary lithium battery electrodes)

L113 ANSWER 4 OF 11 HCA COPYRIGHT 2003 ACS on STN
135:360245 Crystallization of lithium-transition metal oxide thin film for secondary lithium battery. Lee, Jai Yon; Kan, Youn Son; Lee, Ho; Park, Soon Chul; Kan, Yon Mok (Korea Advanced Institute of Science and Technology, S. Korea). Jpn. Kokai Tokkyo Koho JP 2001316817 A2 20011116, 7 pp. (Japanese). CODEN: JKXXAF.
APPLICATION: JP 2000-333625 20001031. PRIORITY: KR 2000-23286 20000501.

AB Li-transition metal oxide thin films for cathodes of Li batteries are formed on substrates by vapor deposition, and the films are processed with plasma. The oxide shows good crystallinity after plasma treatment, and the battery using it shows good cycling performance.

IC C23C014-58; H01M004-04

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 75, 76

ST lithium transition metal oxide crystn plasma processing battery cathode

IT Battery cathodes
Crystallization
Plasma
(crystn. of Li-transition metal oxide thin film by plasma processing for Li battery cathode)

IT Glass, uses
RL: NUU (Other use, unclassified); USES (Uses)
(substrate; crystn. of Li-transition metal oxide thin film by plasma processing for Li battery cathode)

IT 1314-62-1, Vanadium oxide (V2O5), uses 10377-52-3, Lithium phosphate (Li₃PO₄) 12024-01-0, Gallium lithium oxide (GaLiO₂) 12031-65-1, Lithium nickel oxide (LiNiO₂) 12037-42-2, Vanadium oxide (V6O₁₃) 12039-13-3, Titanium sulfide (TiS₂) 12057-17-9, Lithium manganese oxide (LiMn₂O₄) 12057-19-1, Lithium titanium oxide (LiTiO₂) 12190-79-3, Cobalt lithium oxide (CoLiO₂) 12798-95-7 18282-10-5, Tin oxide (SnO₂)
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process); USES (Uses)
(crystn. of Li-transition metal oxide thin film by plasma processing for Li battery cathode)

IT 7440-06-4, Platinum, uses 7440-32-6, Titanium, uses 7631-86-9, Silica, uses
RL: NUU (Other use, unclassified); USES (Uses)
(multilayer substrate; crystn. of Li-transition metal oxide thin film by plasma processing for Li battery cathode)

IT 1344-28-1, Alumina, uses 7429-90-5, Aluminum, uses 7440-21-3, Silicon, uses
RL: NUU (Other use, unclassified); USES (Uses)
(substrate; crystn. of Li-transition metal oxide thin film by plasma processing for Li battery cathode)

IT 7440-32-6, Titanium, uses
RL: NUU (Other use, unclassified); USES (Uses)
(multilayer substrate; crystn. of Li-transition metal oxide thin film by plasma processing for Li

battery cathode)

IT 7429-90-5, Aluminum, uses
 RL: NUU (Other use, unclassified); USES (Uses)
 (substrate; crystn. of Li-transition metal oxide thin film by plasma processing for Li battery cathode)

L113 ANSWER 5 OF 11 HCA COPYRIGHT 2003 ACS on STN
 134:283350 Anodes for secondary lithium batteries
 and the batteries. Ikeda, Hiroaki; Fujimoto, Masahisa; Fujitani, Shin; Shima, Masaki; Yagi, Hiromasa; Tarui, Hisaki; Kurokawa, Hiroshi; Asaoka, Kenji; Matsuda, Shigeki; Domoto, Yoichi; Ohshita, Ryuji; Kato, Yoshio; Nakajima, Hiroshi; Yoshida, Toshikazu (Sanyo Electric Co., Ltd., Japan). PCT Int. Appl. WO 2001029918 A1 20010426, 101 pp.
 DESIGNATED STATES: W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG. (Japanese).
 CODEN: PIXXD2. APPLICATION: WO 2000-JP7297 20001020. PRIORITY: JP 1999-301646 19991022; JP 1999-357808 19991216; JP 1999-365306 19991222; JP 1999-374512 19991228; JP 2000-39454 20000217; JP 2000-47675 20000224; JP 2000-90583 20000329; JP 2000-100405 20000403; JP 2000-150496 20000522; JP 2000-207274 20000707.

AB The anodes have a thin Li intercalating active mass film deposited on both sides of a collector plate. The collector plate is preferably a Cu foil having a surface roughness Ra 0.1-1 .mu.m, and the active mass is Si and/or Ge.

IC H01M004-66; H01M004-02; H01M004-04;
 H01M004-38; H01M004-48; H01M004-58; H01M010-40

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST Secondary lithium battery anode copper collector roughness; silicon anode copper collector roughness lithium battery; germanium anode copper collector roughness lithium battery

IT Battery electrodes
 Surface roughness
 (copper foil collectors with roughened surface for anodes in secondary lithium batteries)

IT 7440-21-3, Silicon, uses 7440-56-4, Germanium, uses
 RL: DEV (Device component use); USES (Uses)
 (copper foil collectors with roughened surface for anodes in secondary lithium batteries)

IT 7440-50-8, Copper, uses
 RL: DEV (Device component use); PRP (Properties); USES (Uses)
 (copper foil collectors with roughened surface for anodes in secondary lithium batteries)

IT 7440-50-8, Copper, uses
 RL: DEV (Device component use); PRP (Properties); USES (Uses)
 (copper foil collectors with roughened surface for anodes in secondary lithium batteries)

L113 ANSWER 6 OF 11 HCA COPYRIGHT 2003 ACS on STN
 130:340686 Anode material for nonaqueous secondary battery, its manufacture, and nonaqueous secondary battery. Akagi, Ryuichi; Nishimura, Toru; Okamoto, Masayuki (Kao Corp., Japan). Jpn. Kokai Tokkyo Koho JP 11135115 A2 19990521 Heisei, 4 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1997-293898 19971027.

AB Li-intercalating semiconductor films comprising elements or

compds. selected from Group IIIA elements, Group IVA elements, and Group VA elements are used as anode active materials for nonaq. batteries. Anodes are manufd. by formation of semiconductor films on collector substrates by evapn. sputtering, ion plating, or CVD. Secondary batteries comprising the anodes, transition metal oxide cathodes, and Li ion-conducting nonaq. electrolytes comprising org. solvents contg. Li compds., polymers contg Li compds., or polymers carrying org. solns. of Li compds. are also claimed. Batteries having excellent charge-discharge cycles, high voltage, and high capacity are obtained.

IC ICM H01M004-36

ICS H01M004-02; H01M004-04; H01M010-40

CC 52-2 (Electrochemical, Radiation, and Thermal Energy Technology)

Section cross-reference(s): 76

ST Group IIIA semiconductor battery anode; Group IVA semiconductor battery anode; Group VA semiconductor battery anode; semiconductor anode lithium nonaq battery; film semiconductor battery anode deposition

IT Vapor deposition process

(chem.; deposition of semiconductor films for manuf. of anodes for nonaq. lithium secondary batteries)

IT Battery anodes

Semiconductor films

Sputtering

Vapor deposition process

(deposition of semiconductor films for manuf. of anodes for nonaq. lithium secondary batteries
)

IT Group IIIA elements

Group IVA elements

Group VA elements

RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)

(deposition of semiconductor films for manuf. of anodes for nonaq. lithium secondary batteries
)

IT Vapor deposition process

(ion plating; deposition of semiconductor films for manuf. of anodes for nonaq. lithium secondary batteries)

IT Secondary batteries

(lithium; deposition of semiconductor films for manuf. of anodes for nonaq. lithium secondary batteries)

IT 7429-90-5, Aluminum, uses 7439-92-1, Lead, uses 7440-21-3, Silicon, uses 7440-28-0, Thallium, uses 7440-31-5, Tin, uses 7440-36-0,

Antimony, uses 7440-38-2, Arsenic, uses 7440-42-8,

Boron, uses 7440-44-0, Carbon, uses 7440-55-3, Gallium, uses 7440-56-4, Germanium, uses 7440-69-9, Bismuth,

uses 7440-74-6, Indium, uses

7723-14-0, Phosphorus, uses 7727-37-9, Nitrogen, uses

RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)

(deposition of semiconductor films for manuf. of anodes for nonaq. lithium secondary batteries
)

IT 7429-90-5, Aluminum, uses 7440-31-5, Tin, uses 7440-36-0, Antimony,

uses 7440-69-9, Bismuth, uses

7440-74-6, Indium, uses

RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(deposition of semiconductor films for manuf. of anodes for nonaq. lithium secondary batteries
)

L113 ANSWER 7 OF 11 HCA COPYRIGHT 2003 ACS on STN

130:225427 **Anode for lithium secondary battery**

and its production. Akiyama, Shoichi (Ricoh Co., Ltd., Japan). Jpn.
Kokai Tokkyo Koho JP 11067208 A2 19990309 Heisei, 22 pp.
(Japanese). CODEN: JKXXAF. APPLICATION: JP 1997-231848 19970813.

AB This anode contains anode active mass of a Li metal-Li compds. composite material comprising a large no. of Li particles coated with Li compds. contg. Li₂CO₃ and compacted. The anode is produced by depositing a large no. of Li metal particles coated with Li compds. on a collector by evapg. or spray coating Li while reacting Li with the ambient gas in a treatment chamber and then pressurizing the deposited Li metal -Li compds. composite material. Dendrite formation in the obtained anode is suppressed and a Li secondary battery comprising the anode has a long cycle life and safety property.

IC ICM H01M004-58

ICS H01M004-02; H01M004-04; H01M004-40;
H01M010-40

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST anode lithium composite dendrite prevention
battery; safety lithium battery anode
dendrite prevention

IT Dendrites (**crystal**)

(formation prevention in anode; lithium secondary battery comprising anode contg. lithium-lithium compd. composite active mass with high resistance to dendrite formation)

IT **Battery anodes**

(lithium secondary battery comprising anode contg. lithium-lithium compd. composite active mass with high resistance to dendrite formation)

IT **Secondary batteries**

(lithium; lithium secondary battery comprising anode contg. lithium-lithium compd. composite active mass with high resistance to dendrite formation)

IT **Safety**

(of battery; lithium secondary battery comprising anode contg. lithium-lithium compd. composite active mass with high resistance to dendrite formation)

IT 554-13-2, **Lithium carbonate 7439-93-2, Lithium**

, uses 7789-24-4, **Lithium fluoride, uses**

RL: DEV (Device component use); USES (Uses)
(anode active mass contg.; lithium secondary battery comprising anode contg. lithium-lithium compd. composite active mass with high resistance to dendrite formation)

IT **7440-50-8, Copper, uses**

RL: DEV (Device component use); USES (Uses)

(anode collector; lithium secondary battery comprising anode contg. lithium-lithium compd. composite active mass with high resistance to dendrite formation)

IT **7439-93-2, Lithium, uses**

RL: DEV (Device component use); USES (Uses)
(anode active mass contg.; lithium secondary **battery**
comprising **anode** contg. lithium-lithium
compd. composite active mass with high resistance to dendrite
formation)

IT 7440-50-8, Copper, uses
RL: DEV (Device component use); USES (Uses)
(anode collector; lithium secondary **battery**
comprising **anode** contg. lithium-lithium
compd. composite active mass with high resistance to dendrite
formation)

L113 ANSWER 8 OF 11 HCA COPYRIGHT 2003 ACS on STN
127:193075 Anodes for secondary lithium batteries
, their manufacture, and the **batteries**. Akiyama, Shoichi (Ricoh
Co., Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 09199180 A2 19970731
Heisei, 7 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1996-26125
19960119.

AB The anodes are carbonaceous anode having areas covered with Li
film by vapor **deposition** and uncovered areas, in a
periodic arrangement on the **surface**, with 3-98% of the total
surface area being covered. The width of the Li film is
.ltoreq.2500 time the thickness of the film. Another form of the anodes
have the whole **surface** covered periodically with thin and thick
Li films, with 3-98% of the total **surface** covered with thick
films, the thick films having a width .ltoreq.2500 time their thickness,
and the thin film having a thickness .ltoreq.5 .mu.m. The electrodes are
prep'd. by masked vapor deposition of Li on the carbonaceous anode.
Secondary Li **batteries** use the above described **anodes**,
Li intercalating cathodes, and an electrolyte.

IC ICM H01M010-40
ICS H01M004-38

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
ST **battery** lithium coated carbonaceous anode
manuf

IT **Battery** anodes
(structure and manuf. of carbonaceous **anode** have
lithium coated area for secondary lithium **batteries**)

IT Carbonaceous materials (technological products)
RL: DEV (Device component use); PEP (Physical, engineering or chemical
process); PROC (Process); USES (Uses)
(structure and manuf. of carbonaceous **anode** have
lithium coated area for secondary lithium **batteries**)

IT 7439-93-2, Lithium, uses
RL: DEV (Device component use); PEP (Physical, engineering or chemical
process); PROC (Process); USES (Uses)
(structure and manuf. of carbonaceous **anode** have
lithium coated area for secondary lithium **batteries**)

IT 7782-42-5, Graphite, uses
RL: DEV (Device component use); PEP (Physical, engineering or chemical
process); PROC (Process); USES (Uses)
(structure and manuf. of graphite **anode** have lithium
coated area for secondary lithium **batteries**)

IT 7439-93-2, Lithium, uses
RL: DEV (Device component use); PEP (Physical, engineering or chemical
process); PROC (Process); USES (Uses)
(structure and manuf. of carbonaceous **anode** have
lithium coated area for secondary lithium **batteries**)

L113 ANSWER 9 OF 11 HCA COPYRIGHT 2003 ACS on STN

126:253350 Amorphous lithium-containing iron oxide thin film as active mass for negative electrode. Guessous, Aicha; Ribes, Michel; Sarradin, Joel (Centre National De La Recherche Scientifique Cnrs, Fr.). Fr. Demande FR 2736043 A1 19970103, 20 pp. (French). CODEN: FRXXBL. APPLICATION: FR 1995-7757 19950628.

AB Prepn. of an amorphous Li-contg. Fe oxide thin layer involves (1) deposition of an amorphous Fe₂O₃ or Fe₃O₄ film <10 .μ.m thick (preferably 0.2-2 .μ.m) by cathodic sputtering on a conductive substrate by using a cryst. α-Fe₂O₃, γ-Fe₂O₃, or Fe₃O₄ target and (2) insertion of Li⁺ into the amorphous thin Fe₂O₃ or Fe₃O₄ film by using an electrochem. cell contg. an electrode consisting of a conductive substrate coated with the amorphous Fe₂O₃ or Fe₃O₄ film, a counter-electrode having an active mass capable of Li⁺ liberation (e.g., Li, Li alloy), and an electrolyte contg. Li salt in an aprotic polar solvent. The resulting anode is suitable for rechargeable rocking-chair Li batteries (esp. microbatteries).

IC ICM C01G049-02
ICS C01D015-02; C23F017-00; C23C014-08; C25D003-42; H01M004-24;
H01M010-24

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
ST lithium iron oxide battery anode

IT Battery anodes
(amorphous lithium-contg. iron oxide thin film as active mass for)

IT Secondary batteries
(rocking-chair; amorphous lithium-contg. iron oxide thin film as active mass for anodes in)

IT 7439-93-2, Lithium, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(in iron oxide active mass for battery anodes)

IT 1309-37-1, Iron oxide (Fe₂O₃), uses 1317-61-9,
Iron oxide (Fe₃O₄), uses
RL: TEM (Technical or engineered material use); USES (Uses)
(lithium-contg. amorphous; active mass for battery anodes)

IT 7439-93-2, Lithium, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(in iron oxide active mass for battery anodes)

L113 ANSWER 10 OF 11 HCA COPYRIGHT 2003 ACS on STN

123:204354 Improved grid alloy for lead-acid battery. Dou, Shi Xue; Chen, You Xiao; Luan, Ben Li; Zhao, Hui Jun; Liu, Hua Kun (Australia). PCT Int. Appl. WO 9515587 A1 19950608, 20 pp. DESIGNATED STATES: W: AM, AT, AU, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, EE, ES, FI, GB, GE, HU, JP, KE, KG, KP, KR, KZ, LK, LR, LT, LU, LV, MD, MG, MN, MW, NL, NO, NZ, PL, PT, RO, RU, SD, SE, SI, SK, TJ, TT, UA, US, UZ; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, DE, DK, ES, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG. (English). CODEN: PIXXD2. APPLICATION: WO 1994-AU737 19941130. PRIORITY: AU 1993-2707 19931130; AU 1993-2736 19931201; AU 1993-2892 19931209.

AB A grid alloy for use esp., but not exclusively, in sealed, maintenance-free Pb-acid batteries includes a component or components which preferably improve mech. strength of the grid and/or prevent or at least decrease the formation of PbSO₄ a corrosion product and/or which improves the surface state of the grid material and/or which inhibit the deposition of various metals on cryst. boundaries of the alloy. The grid alloy can include group 1A and/or Group 5A metallic elements and/or Ag, esp. As and/or Bi, K and/or Na and optionally Ca and/or Li, Sn and/or Cu, Al and/or Mg and/or

Zn.

IC ICM H01M004-38
ICS H01M004-14; H01M004-16; H01M004-73;
C22C011-00; C22C012-00; C22C024-00

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 56

ST electrode grid alloy lead **battery**; arsenic lead alloy electrode grid; bismuth lead alloy electrode grid; potassium lead alloy electrode grid; sodium lead alloy electrode grid; calcium lead alloy electrode grid; lithium lead alloy **electrode** grid; tin lead alloy electrode grid; copper lead alloy electrode grid; aluminum lead alloy electrode grid; magnesium lead alloy electrode grid; zinc lead alloy electrode grid

IT Electrodes
(**battery**, alloys for grids of lead-acid)

IT 167952-11-6P
RL: SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(electrode grid alloy for lead-acid **battery**)

IT 62726-93-6 152725-16-1 167952-12-7 167952-13-8 167952-14-9
167952-15-0
RL: TEM (Technical or engineered material use); USES (Uses)
(electrode grid alloy for lead-acid **battery**)

IT 7429-90-5, Aluminum, uses 7439-93-2,
Lithium, uses 7439-95-4, Magnesium, uses 7440-09-7,
Potassium, uses 7440-23-5, Sodium, uses 7440-31-5, Tin
, uses 7440-38-2, Arsenic, uses 7440-50-8,
Copper, uses 7440-66-6, Zinc,
uses 7440-69-9, Bismuth, uses
7440-70-2, Calcium, uses
RL: MOA (Modifier or additive use); USES (Uses)
(lead-acid **battery** electrode grid alloy microalloyed with)

IT 7429-90-5, Aluminum, uses 7439-93-2,
Lithium, uses 7440-31-5, Tin, uses
7440-50-8, Copper, uses 7440-66-6,
Zinc, uses 7440-69-9, Bismuth,
uses
RL: MOA (Modifier or additive use); USES (Uses)
(lead-acid **battery** electrode grid alloy microalloyed with)

L113 ANSWER 11 OF 11 HCA COPYRIGHT 2003 ACS on STN
120:34508 Method for manufacturing carbon composite electrode material.
Yamada, Kazuo; Tanaka, Hideaki; Mitate, Takehito; Yoshikawa, Masaharu
(Sharp Kabushiki Kaisha, Japan). Eur. Pat. Appl. EP 555080 A1
19930811, 10 pp. DESIGNATED STATES: R: DE, FR, GB. (English).
CODEN: EPXXDW. APPLICATION: EP 1993-300813 19930204. PRIORITY: JP
1992-17969 19920204.

AB The carbon composite electrode material is manufd. by **coating** the surface of **high-crystallinity** carbon particles (e.g., graphite) with a **film** contg. a Group VIII metal (e.g., Ni, Co) followed by **depositing** and/or **covering** the surface with a carbon material derived from pyrolysis of hydrocarbons (e.g., propane). The material is esp. useful for **anodes** in Li **batteries**.

IC ICM H01M004-96
ICS H01M010-40; C01B031-04

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST lithium **battery** anode carbon

IT Anodes
(**battery**, lithium, Group VIII metal and carbon-

coated carbonaceous materials for, manuf. of)
IT 7440-44-0P, Carbon, miscellaneous 7782-42-5P, Graphite, miscellaneous
RL: MSC (Miscellaneous); PREP (Preparation)
(Group VIII metal- and carbon-coated, manuf. of, for
anodes in lithium batteries)
IT 7439-93-2P, Lithium, uses
RL: PREP (Preparation); USES (Uses)
(anodes, Group VIII metal and carbon-coated
carbonaceous materials for, manuf. of, for batteries)
IT 11148-32-6P 7440-02-0P, Nickel, uses
7440-48-4P, Cobalt, uses
RL: PREP (Preparation)
(carbonaceous materials coated with, manuf. of, for
anodes in lithium batteries)
IT 74-98-6, Propane, uses
RL: USES (Uses)
(in manuf. of carbon composite material for anodes in
lithium batteries)
IT 7439-93-2P, Lithium, uses
RL: PREP (Preparation); USES (Uses)
(anodes, Group VIII metal and carbon-coated
carbonaceous materials for, manuf. of, for batteries)
IT 7440-02-0P, Nickel, uses 7440-48-4P,
Cobalt, uses
RL: PREP (Preparation); USES (Uses)
(carbonaceous materials coated with, manuf. of, for
anodes in lithium batteries)

=> d L114 1-10 cbib abs hitind hitrn

L114 ANSWER 1 OF 10 HCA COPYRIGHT 2003 ACS on STN
134:369369 Physico-chemical properties of LiMn₂O₄ films grown by
laser ablation. Camacho-Lopez, M. A.; Escobar-Alarcon, L.;
Haro-Poniatowski, E.; Julien, C. (LMDH, UMR 7603, LMDH, UMR 7603,
Universite Pierre et Marie Curie, Paris, 75252, Fr.). NATO Science
Series, 3: High Technology, 85(Materials for Lithium-Ion Batteries),
535-541 (English) 2000. CODEN: NSSTFF. ISSN: 1388-6576.
Publisher: Kluwer Academic Publishers.

AB Thin films of LiMn₂O₄ were grown by the pulsed-laser deposition
(PLD) technique, in which the control of the deposition parameters
promoted the film stoichiometry. The structural properties of
the PLD films were investigated as a function of the deposition
conditions, that played an important role in the physico-chem.
characteristics of this material. Thin films of LiMn₂O₄ that
were grown onto Si wafers heated to 300.degree. under an O₂ partial
pressure of 100 mtorr exhibited a well-structured polycryst. spinel phase.
Films deposited at lower temps. were highly disordered,
but as an overall result it was demonstrated that the PLD method could be
used to grow films with promising properties for Li microbattery
application.

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 75, 76

ST lithium manganate film laser ablation deposition;
battery cathode lithium manganate film
; Raman scattering spectra lithium manganate film; cyclic
voltammetry lithium manganate film

IT Vapor deposition process
(laser ablation; physicochem. properties of LiMn₂O₄ films
grown by laser ablation for cathodes in Li

microbatteries)
IT **Battery cathodes**
Secondary batteries
(lithium; physicochem. properties of LiMn₂O₄ films
grown by laser ablation for **cathodes** in Li
microbatteries)
IT Cyclic voltammetry
Disorder
Electric potential
Films
Microstructure
Raman spectra
Spinel-type crystals
(physicochem. properties of LiMn₂O₄ **films** grown by laser
ablation for **cathodes** in Li microbatteries)
IT Laser radiation
(pulsed; physicochem. properties of LiMn₂O₄ **films** grown by
laser ablation for **cathodes** in Li microbatteries)
IT **7439-93-2, Lithium, uses**
RL: DEV (Device component use); USES (Uses)
(physicochem. properties of LiMn₂O₄ **films** grown by laser
ablation for **cathodes** in Li microbatteries)
IT 12057-17-9P, Lithium manganate (LiMn₂O₄)
RL: DEV (Device component use); PEP (Physical, engineering or chemical
process); PRP (Properties); SPN (Synthetic preparation); PREP
(Preparation); PROC (Process); USES (Uses)
(physicochem. properties of LiMn₂O₄ **films** grown by laser
ablation for **cathodes** in Li microbatteries)
IT 7440-21-3, Silicon, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(wafer, substrate; physicochem. properties of LiMn₂O₄ **films**
grown by laser ablation for **cathodes** in Li
microbatteries)
IT **7439-93-2, Lithium, uses**
RL: DEV (Device component use); USES (Uses)
(physicochem. properties of LiMn₂O₄ **films** grown by laser
ablation for **cathodes** in Li microbatteries)

L114 ANSWER 2 OF 10 HCA COPYRIGHT 2003 ACS on STN
129:304438 Study of Fe₂O₃-based thin film **electrodes** for
lithium-ion batteries. Sarradin, J.; Ribes, M.;
Guessous, A.; Elkacemi, K. (Laboratoire de Physicochimie de la Matiere
Condensee-UMR 5617, Universite Montpellier, Montpellier, II-34095, Fr.).
Solid State Ionics, 112(1,2), 35-40 (English) 1998. CODEN:
SSIOD3. ISSN: 0167-2738. Publisher: Elsevier Science B.V..
AB Sputter **deposited** thin **films** from an .alpha.-Fe₂O₃
target are studied as an alternative to the carbon-**based**
anode for lithium-ion **batteries**. The prepn.
process of the amorphous thin layers as well as their chem. and phys.
properties are described. The value of the elec. cond. of the thin films
is astonishingly higher than the one measured on the bulk samples.
Depending on the amt. of **intercalated** lithium, a drastic change
of this value is obsd. The electrochem. characteristics obtained on these
amorphous thin layer electrodes regarding their sp. capacity and
cyclability are presented. An attempt to fabricate a lithium-ion
battery comprising a Li₃Fe₂O₃-**based** thin film anode and
a vitreous V₂O₅-B₂O₃-**based** thin film cathode is described.
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
ST iron oxide **anode** lithium ion **battery**
IT **Battery anodes**

(study of iron oxide-based thin-film anodes for lithium-ion batteries)

IT 115428-94-9, Iron lithium oxide (Fe₂Li₃O₃)
RL: DEV (Device component use); USES (Uses)
(anode; study of iron oxide-based thin-film anodes for lithium-ion batteries)

IT 1309-37-1, Iron oxide (Fe₂O₃), uses
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(study of iron oxide-based thin-film anodes for lithium-ion batteries)

L114 ANSWER 3 OF 10 HCA COPYRIGHT 2003 ACS on STN
128:160196 Lithium insertion electrodes based on niobium telluride thin films. Pailharey, Daniel; Mathey, Yves; Lavela, Pedro; Tirado, Jose L. (Departement de Physique, Faculte des Sciences de Luminy, Marseille, 13288, Fr.). Electrochimica Acta, Volume Date 1998, 43(5-6), 495-502 (English) 1997. CODEN: ELCAAV. ISSN: 0013-4686. Publisher: Elsevier Science Ltd..

AB Niobium telluride thin films were evaluated as intercalation electrodes in lithium cells. The film were prepd. on Al substrate by sputter deposition under different exptl. conditions. Large deposition periods lead to a noncryst. film material, while short deposition periods gave layered particles structurally similar to niobium ditelluride. For preps. carried out at 300.degree., the particles have sizes of .apprx.1 .mu.m with their 001 planes oriented parallel to the substrate. At 330.degree., particles of .apprx.10 .mu.m with their 001 axis parallel to the substrate were obtained. Test batteries Li/LiClO₄(PC)/niobium telluride film were studied by potentiostatic and galvanostatic procedures. The performance of the batteries is influenced by the prepn. conditions. Cell capacities larger than 100 mA h g⁻¹ and a good capacity retention after 50 cycles were obstd. for films prepd. at 300.degree. when the cells were cycled between 0.5 and 2.0 V.

CC 72-2 (Electrochemistry)
Section cross-reference(s): 52, 75, 78

ST lithium insertion electrode niobium telluride film;
intercalation electrode niobium telluride film lithium

IT Intercalation
(electrochem.; of lithium by niobium telluride in propylene carbonate contg. LiClO₄: lithium insertion electrodes based on niobium telluride thin films)

IT Electrodes
(lithium insertion; sputter deposition of niobium telluride film on aluminum for lithium insertion electrodes)

IT Secondary batteries
(lithium-niobium telluride)

IT Battery cathodes
(niobium telluride)

IT Sputtering
(of niobium telluride film on aluminum for lithium insertion electrodes)

IT 7439-93-2, Lithium, uses
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process); USES (Uses)
(electrochem. intercalation by niobium telluride:
lithium insertion electrodes based on niobium telluride thin films)

IT 7791-03-9, Lithium perchlorate

RL: NUU (Other use, unclassified); PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process); USES (Uses)
(electrochem. intercalation of lithium by niobium telluride
in propylene carbonate contg. LiClO₄: lithium insertion
electrodes based on niobium telluride thin films)

IT 12034-83-2, Niobium telluride nbte2 162124-03-0, Niobium telluride
202518-77-2, Niobium telluride (NbTe1.28-1.38)
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process); USES (Uses)
(film prepn. and lithium electrochem. intercalation:
lithium insertion electrodes based on
niobium telluride thin films)

IT 7429-90-5, Aluminum, uses
RL: NUU (Other use, unclassified); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(sputter deposition of niobium telluride film on aluminum for
lithium insertion electrodes)

IT 7439-93-2, Lithium, uses
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process); USES (Uses)
(electrochem. intercalation by niobium telluride:
lithium insertion electrodes based on
niobium telluride thin films)

IT 7429-90-5, Aluminum, uses
RL: NUU (Other use, unclassified); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(sputter deposition of niobium telluride film on aluminum for
lithium insertion electrodes)

L114 ANSWER 4 OF 10 HCA COPYRIGHT 2003 ACS on STN
125:15263 Thin-film, solid state **battery** employing electrically insulating, ion-conducting electrolyte material. Ovshinsky, Stanford R. (Ovonic Battery Company, Inc., USA). U.S. US 5512387 A 19960430, 12 pp., Cont.-in-part of U.S. Ser. No. 155,059, abandoned. (English). CODEN: USXXAM. APPLICATION: US 1994-198757 19940218. PRIORITY: US 1993-155059 19931119.

AB The **battery** comprises a **substrate**, .gtoreq.1 multilayered electrochem. **cell** deposited on the **substrate**, and an elec. conductive **layer** deposited on the top of the last of the multilayered electrochem. **cells**. Each layer of the multilayered **cell** consists of a layer of neg. electrode material capable of electrochem. adsorbing and desorbing ions during charge and discharge, a layer of pos. electrode material capable of electrochem. desorbing and adsorbing ions during charge and discharge, and a layer of insulating/conducting material disposed between the layers of pos. and neg. electrode material. The layer of insulating/conducting material is elec. insulating and capable of readily conducting or transporting ions from the layer of pos. electrode material to the layer of neg. electrode material while the **battery** is charging and vice versa while the **battery** is discharging. The elec. conductive **layer** provides 1 **battery** terminal.

IC ICM H01M010-36
ICS H01M002-30

NCL 429152000

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST solid state thin film **battery**

IT **Batteries, secondary**
(solid-state thin-film)

IT 12031-65-1, Lithium nickel oxide (LiNiO₂) 12054-48-7, Nickel hydroxide (Ni(OH)₂) 12162-79-7, Lithium manganese oxide (LiMnO₂) 12190-79-3,

Cobalt lithium oxide (CoLiO₂)
 RL: DEV (Device component use); USES (Uses)
 (cathodes in solid-state thin-film batteries)

IT 1314-62-1, Vanadium oxide (V₂O₅), uses
 RL: DEV (Device component use); USES (Uses)
 (cathodes in solid-state thin-film batteries from amorphous)

IT 7439-93-2, Lithium, uses
 RL: DEV (Device component use); USES (Uses)
 (solid-state thin-film battery anodes)

IT 1333-74-0, Hydrogen, uses
 RL: DEV (Device component use); USES (Uses)
 (solid-state thin-film battery anodes from alloys absorbing)

IT 7440-44-0, Carbon, uses
 RL: DEV (Device component use); USES (Uses)
 (solid-state thin-film battery anodes from lithium-intercalatable or hydrogenated)

IT 12033-89-5, Silicon nitride, uses
 RL: DEV (Device component use); USES (Uses)
 (solid-state thin-film battery electrolyte from hydrogenated or lithiated)

IT 7439-93-2, Lithium, uses
 RL: DEV (Device component use); USES (Uses)
 (solid-state thin-film battery anodes)

L114 ANSWER 5 OF 10 HCA COPYRIGHT 2003 ACS on STN

123:118645 Solid state battery using ionic or protonic electrolyte.
 Ovshinsky, Stanford R.; Young, Rosa (Ovonic Battery Co., Inc., USA). PCT
 Int. Appl. WO 9514311 A1 19950526, 26 pp. DESIGNATED STATES: W:
 AU, BR, CA, DK, FI, JP, KR, NO, RU, UA; RW: AT, BE, CH, DE, DK, ES, FR,
 GB, GR, IE, IT, LU, MC, NL, PT, SE. (English). CODEN: PIXXD2.
 APPLICATION: WO 1994-US12297 19941026. PRIORITY: US 1993-155059 19931119.

AB The battery comprises a substrate, .gt;oreq.1 multilayered electrochem. cell deposited on the substrate, and an elec. conductive layer deposited on the top the last of the multilayered electrochem. cells, the elec. conductive layer providing 1 battery terminal. The multilayered electrochem. cell comprises a layer of neg. electrode material capable of electrochem. adsorbing and desorbing ions during charge and discharge, a layer of pos. electrode material capable of electrochem. desorbing and adsorbing ions during charge and discharge, and a layer of insulating/conducting material disposed between the 2 electrode material layers. The layer of insulating/conducting material is elec. insulating and capable of readily conducting or transporting ions from the layer of pos. electrode material to the layer of neg. electrode material while the battery is charging and from the layer of neg. electrode material to the layer of pos. electrode material while the battery is discharging.

IC ICM H01M006-18
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
 ST battery ionic protonic electrolyte
 IT Carbonaceous materials
 RL: DEV (Device component use); USES (Uses)
 (anodes in solid state battery using ionic or protonic electrolyte from lithium-intercalatable)
 IT Batteries, secondary
 (solid-state using ionic or protonic electrolyte)
 IT 1333-74-0, Hydrogen, uses
 RL: TEM (Technical or engineered material use); USES (Uses)
 (anodes in solid state battery using ionic or protonic electrolyte)

IT 7439-93-2, Lithium, uses

RL: DEV (Device component use); USES (Uses)
(anodes in solid state **battery** using ionic or
protic electrolyte from carbonaceous materials **intercalatable**
with)

IT 12033-89-5, Silicon nitride, uses

RL: TEM (Technical or engineered material use); USES (Uses)
(hydrogenated; insulating/conducting material in solid state
battery using ionic or protic electrolyte)

IT 12031-65-1, Lithium nickel oxide (LiNiO₂) 12054-48-7, Nickel hydroxide
(Ni(OH)₂) 12162-79-7, Lithium manganese oxide (LiMnO₂) 12190-79-3,
Cobalt lithium oxide (CoLiO₂)

RL: DEV (Device component use); USES (Uses)
(in cathodes of solid state **battery** using ionic or protic
electrolyte)

IT 7439-93-2, Lithium, uses

RL: DEV (Device component use); USES (Uses)
(anodes in solid state **battery** using ionic or
protic electrolyte from carbonaceous materials **intercalatable**
with)

L114 ANSWER 6 OF 10 HCA COPYRIGHT 2003 ACS on STN

123:118408 Vanadium pentoxide gels from liquid crystals to lithium
batteries. Livage, J.; Baffier, N.; Pereira-Ramos, J. P.;
Davidson, P. (Chim. Matiere Condensee, Univ. P. M. Curie, Paris, 75252,
Fr.). Materials Research Society Symposium Proceedings, 369(Solid State
Ionics IV), 179-90 (English) 1995. CODEN: MRSPDH. ISSN:
0272-9172. Publisher: Materials Research Society.

AB Vanadium pentoxide gels V2O₅.nH₂O are formed via the condensation of
vanadic acid in aq. solns. They exhibit both ionic and electronic cond.
and could therefore be used as **cathode** materials in
lithium batteries or electrochromic display devices.
The polymn. process leads to ribbon-like vanadium pentoxide particles. In
a given range of concn., sols and gels exhibit a homogeneous lyotropic
nematic phase in which the ribbons align in the same direction. Ordered
fluid phases are thus obtained leading to oriented films when
deposited onto flat **substrates**. Moreover, mixed oxides
M_xV₂O₅ (M = Na⁺, K⁺, Ba²⁺, Al³⁺, Fe³⁺,...) exhibiting some preferred
orientation are obtained via ion exchange. These compds. exhibit improved
electrochem. properties (specific capacity, cycling properties) compared
to usual mixed oxides prepd. via solid state reactions.

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 72, 74

ST **lithium battery cathode** vanadium pentoxide
gel; electrochromic display device vanadium pentoxide gel

IT Cathodes

(**battery**, vanadium pentoxide gels from liq. crystals to
lithium **batteries**)

IT Inclusion reaction

(**intercalation**, electrochem., electrochem. insertion of
lithium in vanadium pentoxide gels for lithium **batteries**)

IT 7439-93-2, Lithium, processes

RL: PEP (Physical, engineering or chemical process); PROC (Process)
(electrochem. insertion of lithium in vanadium pentoxide gels for
lithium **batteries**)

IT 1314-62-1, Vanadium pentoxide, uses

RL: DEV (Device component use); USES (Uses)
(vanadium pentoxide gels from liq. crystals to lithium
batteries)

L114 ANSWER 7 OF 10 HCA COPYRIGHT 2003 ACS on STN
110:196330 Behavior of the negative and positive electrodes in an aprotic secondary lithium cell. Wiesener, K.; Eckoldt, U.; Muller, J.; Schneider, W.; Rahner, D. (Dep. Chem., Dresden Univ. Technol., Dresden, 8027, Ger. Dem. Rep.). Bulletin of Electrochemistry, 5(1), 23-7 (English) 1989. CODEN: BUELE6. ISSN: 0256-1654.

AB The performance of **Li anodes** was affected by Li deposition and dissoln. i.e. the formation and removal of **surface layers** related to electrolyte and side reactions, as indicated by studies by Li and **Li-Al anodes** in org. solvent electrolyte. The cycling efficiency of V2O5 cathodes was detd. by **cryst. structure changes**; $\Delta E_{\text{req.}} = 3.1$ V, the cycling reaction (i.e. Li **intercalation**) was reversible, but when the discharge voltage reached the 2nd plateau, $\Delta E_{\text{req.}} = 2.0$ V, irreversible lattice changes occurred and the cycling efficiency deteriorated.

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 72

ST **lithium anode surface layer**
cycling; vanadium oxide cathode cycling performance;
intercalation lithium vanadium oxide reversibility;
battery intercalation lithium vanadium oxide

IT Electric resistance
(of **lithium anode surface layer**, cycling efficiency in relation to)

IT Electrolytic polarization
(of lithium, **surface layer deposition**-dissoln. during, cycling efficiency in relation to)

IT Anodes
(**battery**, lithium, cycling efficiency of, **surface layer** formation-dissoln. effect on)

IT Cathodes
(**battery**, vanadium pentoxide, phase changes during cycling of, lithium **intercalation** effect on)

IT Inclusion reaction
(**intercalation**, electrochem., of lithium, by vanadium pentoxide cathode, phase change and cycling efficiency in relation to)

IT 7439-93-2, Lithium, uses and miscellaneous
RL: USES (Uses)
(anodes, cycling efficiency of, **surface layer** formation-dissoln. effect on)

IT 1314-62-1, Vanadium oxide (V2O5), uses and miscellaneous
RL: USES (Uses)
(cathodes, phase changes during cycling of, lithium **intercalation** effect on)

IT 7429-90-5, Aluminum, uses and miscellaneous
7440-02-0, Nickel, uses and miscellaneous
RL: USES (Uses)
(electrodes, lithium **surface layer** on, anode cycling efficiency in relation to)

IT 96-47-9, 2-Methyltetrahydrofuran 109-99-9, THF, uses and miscellaneous
RL: USES (Uses)
(electrolytes contg. lithium salt and, lithium **anode** cycling characteristics in)

IT 14727-56-1, Decaline
RL: USES (Uses)
(electrolytes contg., lithium salt-org. solvent, lithium **anode** potential in relation to)

IT 7791-03-9, Lithium perchlorate (LiClO₄) 21324-40-3, Lithium hexafluorophosphate (LiPF₆) 29935-35-1, Lithium hexafluoroarsenate

(LiAsF₆)
RL: USES (Uses)
(electrolytes of org. solvent and, lithium anode
cycling characteristics in)

IT 7439-93-2, Lithium, uses and miscellaneous
RL: USES (Uses)
(anodes, cycling efficiency of, surface layer
formation-dissoln. effect on)

IT 7429-90-5, Aluminum, uses and miscellaneous
7440-02-0, Nickel, uses and miscellaneous
RL: USES (Uses)
(electrodes, lithium surface
layer on, anode cycling efficiency in relation to)

L114 ANSWER 8 OF 10 HCA COPYRIGHT 2003 ACS on STN
110:157635 The formation of pyrolytic carbon on a nickel sheet. Wada,
Hiroshi; Suzuki, Tomonari; Yoshimoto, Yoshikazu; Yoshida, Masaru;
Nakajima, Shigeo (Cent. Res. Lab., Sharp Corp., Tenri, 632, Japan).
Japanese Journal of Applied Physics, Part 2: Letters, 28(2), L284-L286
(English) 1989. CODEN: JAPLD8. ISSN: 0021-4922.

AB Films of C deposited on Ni substrates by
pyrolysis of C₆H₆ at 1000.degree., have a graphitic morphol. suitable
for Li intercalation, for use as battery cathodes.
When the C₆H₆ concn. in Ar carrier gas was <0.7%, the degree of
graphitization was high, the surface morphol. was angular, and
there was a 10-35% Ni content on the surface, which was extruded
from the substrate.

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 49

ST graphitized carbon benzene pyrolysis nickel; cathode pyrolytic
carbon lithium intercalation; battery
cathode pyrolytic carbon

IT Graphitized carbon black
RL: PREP (Preparation)
(prepn. of, benzene pyrolysis for, for lithium
battery intercalation cathodes)

IT Cathodes
(battery, graphitized carbon for, prepn. of, benzene
pyrolysis for, for lithium intercalation batteries)

IT 71-43-2P, Benzene, reactions
RL: RCT (Reactant); PREP (Preparation); RACT (Reactant or reagent)
(pyrolysis of, on nickel, for graphitized carbon prepn., for
lithium battery cathodes)

IT 7782-42-5P, Graphite, preparation
RL: PREP (Preparation)
(pyrolytic, prepn. of, from benzene, for lithium
battery intercalation cathodes)

IT 7440-02-0, Nickel, uses and miscellaneous
RL: USES (Uses)
(substrates, benzene pyrolysis on, graphitization by, for
lithium battery cathodes)

IT 7440-02-0, Nickel, uses and miscellaneous
RL: USES (Uses)
(substrates, benzene pyrolysis on, graphitization by, for
lithium battery cathodes)

L114 ANSWER 9 OF 10 HCA COPYRIGHT 2003 ACS on STN

108:189847 Molybdenum trisulfide thin film cathodes prepared by chemical vapor
deposition. Schleich, D. M.; Chang, H. S.; Barberio, Y. L. (Polytech.
Univ., Brooklyn, NY, 11201, USA). Proceedings - Electrochemical Society,

88-6(Proc. Symp. Primary Second. Ambient Temp. Lithium Batteries, 1987), 464-76 (English) 1988. CODEN: PESODO. ISSN: 0161-6374.

AB Thin-film MoS₃ cathodes were prep'd. by chem. vapor deposition from MoF₆ and hexamethyldisilathiane at 200-250.degree. on Al, Ni, and Al₂O₃ substrates. Films deposited at 230.degree. have a min. resistivity of 90 k.OMEGA.-cm. In a Li/LiClO₄-propylene carbonate/MoS₃ test battery, 4 equivs. were discharged and 3 equiv. could be reversibly charged at 1.8 V vs. Li. A 2 equiv. capacity was maintained after 100 deep cycles at 0.2 mA/cm².

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 72

ST molybdenum sulfide cathode lithium intercalation; lithium molybdenum sulfide battery

IT Cathodes
(battery, molybdenum sulfide, chem. vapor deposition and cycling behavior of, in lithium intercalation battery)

IT Electric resistance
(sheet, of molybdenum trisulfide thin films, deposition temp. and thickness effect on)

IT 7429-90-5, Aluminum, uses and miscellaneous
RL: USES (Uses)
(cathode substrates, molybdenum trisulfide deposition on, for lithium intercalation batteries)

IT 12033-29-3, Molybdenum sulfide (MoS₃)
RL: USES (Uses)
(cathodes, chem. vapor deposition and cycling behavior of, in lithium intercalation batteries)

IT 7429-90-5, Aluminum, uses and miscellaneous
RL: USES (Uses)
(cathode substrates, molybdenum trisulfide deposition on, for lithium intercalation batteries)

L114 ANSWER 10 OF 10 HCA COPYRIGHT 2003 ACS on STN
87:143215 Scanning electron microscopic studies of lithium and cycle behavior of lithium nonaqueous cells with transition metal chalcogenide cathodes. Broadhead, John; Trumbore, Forrest A. (Bell Lab., Murray Hill, NJ, USA). Power Sources 5: Res. Dev. Non-Mech. Electr. Power Sources, Proc. Int. Symp., 9th, Meeting Date 1974, 661-82. Editor(s): Collins, Derek H. Academic: London, Engl. (English) 1975. CODEN: 36LPAF.

AB Studies were made on the rechargeability of batteries contg. cathodes of NbSe₃, NbS₃, TaSe₃, and TiS₃ in 1M LiClO₄ in propylene carbonate. All systems showed rechargeability and, except with TiS₃, cell failures were related to Li anode morphol. changes. Scanning electron micrographs of the Li anodes as well as the assocd. chronopotentiograms of Li deposition on metal substrates are also presented. In selected electrolytes, completely smooth surfaces of Li were obsd. for several cycles, while by 10 cycles densely packed cryst. Li was obsd. Cycle expts. with Li anodes in 0.6M Bu₄NI in 1M LiClO₄ in propylene carbonate exhibited 130 cycles at .apprx.50% depth of cathode discharge compared with .apprx.90 cycles at 25% depth of discharge when 1M LiClO₄ in propylene carbonate was used as the electrolyte.

CC 72-2 (Electrochemistry)

ST lithium anode chalcogenide cathode org; transition metal chalcogenide cathode battery

IT Transition metal chalcogenides
RL: USES (Uses)
(cathodes, in lithium cells,

rechargeability in relation to)
IT Cathodes
(battery, transition metal chalcogenide, rechargeability of)
IT Anodes
(battery, lithium, rechargeability of)
IT 7439-93-2, uses and miscellaneous
RL: USES (Uses)
(anodes, in batteries with transition metal chalcogenides,
rechargeability of)
IT 12034-78-5 12039-57-5 12316-04-0 12423-80-2
RL: PRP (Properties)
(cathodes, in lithium batteries,
rechargeability of)
IT 7439-93-2, uses and miscellaneous
RL: USES (Uses)
(anodes, in batteries with transition metal chalcogenides,
rechargeability of)

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L88 ANSWER 1 OF 6 JAPIO (C) 2003 JPO on STN
AN 1998-083808 JAPIO
TI ANODE FOR LITHIUM SECONDARY BATTERY
IN KOJIMA YOSHITSUGU; KOIWAI AKIHIKO; SUZUKI NOBUAKI
PA TOYOTA CENTRAL RES & DEV LAB INC
PI JP 10083808 A 19980331 Heisei
AI JP 1996-262503 (JP08262503 Heisei) 19960910
PRAI JP 1996-262503 19960910
SO PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 1998
IC ICM H01M004-02
ICS H01M004-58; H01M010-40
AB PROBLEM TO BE SOLVED: To provide a lithium secondary battery with high
charging and discharging capacity by composing an anode active material of
cokes and graphite and specifying the addition amount of the graphite.
SOLUTION: The addition amount of graphite is controlled to be 2-40wt.% to
the total amount (100wt.%) of cokes and graphite. Consequently, the
conductivity of the resultant anode active material becomes high as
compared with that of an anode active material consisting of only cokes.
The coke crystallites 10 partly have the same layer structure as
graphite and lithium ion can be intercalated as it is into the
interlayers 12 in the layer structure. Cavities 11 are formed
between end parts 12 of a coke crystallite 10 and end parts 12
of other coke crystallites 10 and lithium clusters 20 produced
from lithium ions 2 are absorbed and stored in the cavities. As
a result, much more lithium ions can be absorbed and stored and an
anode for a lithium secondary battery having high
charging and discharging capacity can be obtained.
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L88 ANSWER 2 OF 6 JAPIO (C) 2003 JPO on STN

AN 1996-203527 JAPIO
TI NONAQUEOUS ELECTROLYTE SECONDARY BATTERY
IN NITTA YOSHIKI; WATANABE SHOICHIRO; SHIMAMURA HARUNARI; KAWAMURA YUMIKO
PA MATSUSHITA ELECTRIC IND CO LTD
PI JP 08203527 A 19960809 Heisei
AI JP 1995-12586 (JP07012586 Heisei) 19950130
PRAI JP 1995-12586 19950130
SO PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 1996
IC ICM H01M004-58
ICS H01M010-40
AB PURPOSE: To provide a negative electrode with full reversibility which never allows deposition of Li at the time of its low temperature as well as to prevent needle-like **deposition of metallic Li** on the **electrode plate surface** of a negative electrode by using a substance expressed by a specific general formula as the negative electrode.
CONSTITUTION: A negative pole 5 expressed by a general formula ($\text{SnS}_{2-} \text{CoOp}_{2-}$)
 $\text{Lix}_{(0 <= x <= 1.0)}$ is produced by **intercalating** cobaltocene expressed by CoCp_{3-} to SnS_{2-} at 120°C for 3 weeks. Or it is produced by **intercalating** cobaltocene to SnS_{2-} for 25 days by using ethylene glycol dimethyl ether solution of 0.19M, and specific quantity of depolarizer obtained by mixing 10wt quantity of polyvinylidene fluoride serving as a bonding agent to 90wt part of negative pole is formed on a current collector 3 to build up an electrode. The electrode is dried under reduced pressure at 150°C and then assembled **in** a battery. Electrolyte may be used **in** such a manner that solvent formed by equivalent volumes of ethylene carbonate 1 and diethylcarbonate 1 are mixed together may solve 6 fluoric acid Li with its concentration of 1M/1. The negative may satisfy general formula ($\text{SnS}_{2-} \text{CoCp}_{3-}$)
 $\text{Lix}_{(0 <= x <= 1.0)}$ after being charged/discharged.
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L88 ANSWER 3 OF 6 JAPIO (C) 2003 JPO on STN
AN 1996-138743 JAPIO
TI NONAQUEOUS ELECTROLYTE SECONDARY BATTERY
IN INOUE KAORU; OZAKI YOSHIYUKI; KOSHINA HIDE; MORITA TERUYOSHI
PA MATSUSHITA ELECTRIC IND CO LTD
PI JP 08138743 A 19960531 Heisei
AI JP 1994-279120 (JP06279120 Heisei) 19941114
PRAI JP 1994-279120 19941114
SO PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 1996
IC ICM H01M010-40
ICS H01M004-02; H01M004-62
AB PURPOSE: To provide a nonaqueous electrolyte secondary battery, preventing the heating of deposited lithium and excellent **in safety**, by adding carbonate, such as alkaline metal, alkaline earth metal, and transition metal, to a negative electrode having the active material of a lithium ion.
CONSTITUTION: In a nonaqueous electrolyte secondary battery, the following are used: a positive **electrode**, composed of a **lithium**-containing metallic oxide, and a negative electrode, composed of material having the active material of a lithium ion, e.g. carbon material, etc., capable of reversibly **intercalating/deintercalating** lithium. At that time, carbonate of one kind or more of alkaline metal carbonate, alkaline earth metal carbonate, and transition metal carbonate is added to the negative electrode. This carbonate is preferably e.g. $\text{Na}_{2-}\text{CO}_{3-}$

>3</SB> or Li<SB>2</SB>CO<
SB>3</SB>, and the added quantity is preferably 1-10wt.%
of the negative **electrode**. Consequently, **metallic**
lithium, dendritically **deposited** on the negative
electrode, reacts to an ion carbonate to form insoluble Li<SB>2</SB>CO<SB>3</SB> coating to
increase the safety of the battery.

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L88 ANSWER 4 OF 6 JAPIO (C) 2003 JPO on STN
AN 1993-307958 JAPIO
TI NONAQUEOUS ELECTROLYTE SECONDARY BATTERY
IN MORIGAKI KENICHI; KOBAYASHI SHIGEO; TERAOKA TAKAHIRO
PA MATSUSHITA ELECTRIC IND CO LTD
PI JP 05307958 A 19931119 Heisei
AI JP 1992-111082 (JP04111082 Heisei) 19920430
PRAI JP 1992-111082 19920430
SO PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 1993
IC ICM H01M004-58
ICS H01M004-02; H01M010-40
AB PURPOSE: To increase the **intercalation** quantity of lithium to
increase the capacity of a negative electrode, and prevent the generation
of dendrite of lithium by using the spherical graphite, which is obtained
by graphitizing the mesophase fine spheres, for a negative electrode.
CONSTITUTION: A nonaqueous electrolyte secondary battery consists of a
negative electrode 3 mainly composed of the graphite material, a positive
electrode 6 having the **lithium** included metal oxide as
the active material thereof, the organic electrolyte and a separator 5.
In this case, as the graphite material, spherical graphite, which
is obtained by graphitizing the mesophase fine spheres generated
in the liquid phase carbonizing process of a pitch group and which
has 3.37Å or less of layer-to-layer distance measured by the X-ray
diffraction method and 500Å or more of largeness of a
crystallite in the c-axis direction and 500Å or
more of largeness of a **crystallite** in the a-axis
direction and 3-50μm of the mean grain size, is used. A negative
electrode 3, in which a large quantity of lithium is
intercalated to increase the capacity thereof, is thereby
obtained, and the generation of dendrite of lithium is prevented.
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L88 ANSWER 5 OF 6 JAPIO (C) 2003 JPO on STN
AN 1993-307957 JAPIO
TI NONAQUEOUS ELECTROLYTE SECONDARY BATTERY
IN MORIGAKI KENICHI; KOBAYASHI SHIGEO; TERAOKA TAKAHIRO; OTA AKIRA
PA MATSUSHITA ELECTRIC IND CO LTD
PI JP 05307957 A 19931119 Heisei
AI JP 1992-111070 (JP04111070 Heisei) 19920430
PRAI JP 1992-111070 19920430
SO PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 1993
IC ICM H01M004-58
ICS H01M004-02; H01M010-40
AB PURPOSE: To increase the **intercalation** quantity of lithium to
increase the capacity of a negative electrode, and prevent the generation
of dendrite of lithium by graphitizing mesophase fine spheres, which are
generated in the liquid phase carbonizing process of a pitch
group.
CONSTITUTION: A nonaqueous electrolyte secondary battery consists of a
negative electrode 3 mainly composed of the graphite material, in
which lithium is **intercalated**, a positive **electrode** 6

having the lithium included metal oxide as active material, the organic electrolyte and a separator 5. In this case, as the graphite material, the spherical graphite, which is obtained by graphitizing the mesophase fine spheres generated in the liquid phase carbonizing process of a pitch group and which has 3.37Å or less of a layer-to-layer distance measured by the X-ray diffraction method and 500Å or more of largeness of a **crystallite** in the c-axis direction and 3% or less of volume ratio of the spherical graphite having the grain size of 6μm or less among the distribution of grain size and 15μm-25μm of mean grain size, is used. A negative electrode, in which a large quantity of lithium is **intercalated** to increase the capacity thereof, is thereby provided, and while the generation of dendrite of lithium is prevented.

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L88 ANSWER 6 OF 6 JAPIO (C) 2003 JPO on STN
AN 1989-217854 JAPIO
TI POSITIVE ELECTRODE MATERIAL FOR LITHIUM SECONDARY
BATTERY
IN MIZOGUCHI AKIRA
PA SUMITOMO ELECTRIC IND LTD
PI JP 01217854 A 19890831 Heisei
AI JP 1988-41606 (JP63041606 Showa) 19880223
PRAI JP 1988-41606 19880223
SO PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 1989
IC ICM H01M004-02
ICS H01M004-58
AB PURPOSE: To obtain a positive electrode material having large energy density and making internal resistance low by containing a graphite vapor-deposition layer directly covered from a vapor phase on a carbon fiber **base** material and a guest compound **intercalated** in this vapor-deposition layer.
CONSTITUTION: A carbon fiber **base** material 1, a graphite vapor-deposition layer 2 directly covered from a vapor phase on the **base** material 1, and a guest compound **intercalated** in the vapor-deposition layer 2 are contained. The vapor-deposition layer 2 directly covered from the vapor phase on the **base** material 1 grows and it further grows by heat treatment. By **intercalating** a guest compound, an electrochemical reaction area is enlarged, and a positive electrode material having high energy density is obtained. A fibrous graphite **intercalation** compound 4 has good electroconductivity and makes internal resistance low.
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L89 ANSWER 1 OF 18 JAPIO (C) 2003 JPO on STN
AN 2003-124064 JAPIO
TI ELECTROCHEMICAL DEVICE
IN MORIMOTO HIDEYUKI; NAGAI TATSU
PA HITACHI MAXELL LTD
PI JP 2003124064 A 20030425 Heisei
AI JP 2001-312329 (JP2001312329 Heisei) 20011010
PRAI JP 2001-312329 20011010
SO PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 2003
IC ICM H01G009-00
ICS H01G009-038; H01G009-058; H01M004-02; H01M004-52;
H01M004-62; H01M010-40
AB PROBLEM TO BE SOLVED: To provide an electrochemical device which is

superior in cyclic properties, high in capacitance, and of high-energy density type.

SOLUTION: An electrode contains oxy iron hydroxide-coated high-electron conductivity particulates that are each composed of a high-electron conductivity particulate, having a specific surface area of 5 m²/g to 100 m²/g and an average grain diameter of 50 nm or below as a primary particle and oxy iron hydroxide covering the high-electron conductivity particulate. A lithium intercalation electrode contains lithium ions and functions as the counter electrode of the former electrode. These two electrodes are arranged through the intermediary of an electrolyte so as to compose an electrochemical device. The oxy iron hydroxide can be substituted by crystalline β -FeOOH or amorphous material containing, at least, one out of Ti, V, and Cu. It is preferable that acetylene black is used as the high-electron conductivity particulates.

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L89 ANSWER 2 OF 18 JAPIO (C) 2003 JPO on STN
AN 2001-202961 JAPIO
TI ANODE MATERIAL FOR LITHIUM SECONDARY BATTERY, ITS MANUFACTURING METHOD AND LITHIUM SECONDARY BATTERY
IN FUKUDA KENJI; HARA YOICHIRO; UMENO TATSUO; HIRUTA TAKASHI; YASUMOTO YOSHINORI; TSUNAWAKE TADANORI; MATSUNAGA OSAMU; IWANAGA KATSUSUKE
PA MITSUI MINING CO LTD
PI JP 2001202961 A 20010727 Heisei
AI JP 2000-13514 (JP2000013514 Heisei) 20000121
PRAI JP 2000-13514 20000121
SO PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 2001
IC ICM H01M004-58
AB PROBLEM TO BE SOLVED: To provide an anode material for realizing lithium secondary battery, which has high discharge capacity and which is capable of high-speed charging and discharging as well as restraining decomposition of an electrolytic solvent, and to provide a lithium secondary battery using the anode material.
SOLUTION: By using a mixed gas of an organic matter and an inert gas, in which the molarity of the organic matter is 2% to 50%, graphite particles are processed by chemical vapor deposition in a fluidized bed reactor at a temperature range of 90°C and 1,200°C to form an anode material for a lithium secondary battery, which is made of graphite particles and a crystalline carbon layer that covers the whole surface of the graphite particles, and in which the whole surface of the graphite particles is parallel to a (002) face of a carbon in the carbon layer.

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L89 ANSWER 3 OF 18 JAPIO (C) 2003 JPO on STN
AN 2000-231937 JAPIO
TI NONAQUEOUS ELECTROLYTE SECONDARY BATTERY
IN TAKEUCHI YOJI; UKIYOU YOSHIO; HONMA TAKAHIKO; NORITAKE TATSUO; NAKANO HIDEYUKI; OKUDA NARUAKI; KOBAYASHI TETSUO; SASAKI ITSUKI; MUKAI KAZUHIKO
PA TOYOTA CENTRAL RES & DEV LAB INC
PI JP 2000231937 A 20000822 Heisei
AI JP 1999-31085 (JP11031085 Heisei) 19990209
PRAI JP 1999-31085 19990209
SO PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 2000
IC ICM H01M010-40
AB PROBLEM TO BE SOLVED: To reduce a cost, enhance cycle characteristics and

secure safety when overcharging as well as to stabilize a positive electrode active material itself, by using a positive electrode active material of a lithium nickel composite oxide having a rock-salt structure with orderly arranged layers obtained by substituting a part of a Ni site by other elements for the positive electrode and a negative electrode active material of a mixture of graphite and coke for the negative electrode.

SOLUTION: The composition of a composite oxide for a positive electrode active material is shown by the formula $\text{LiNi}_x\text{M}_1\text{yM}_2\text{zO}_{2z}$. (In the formula, M_1 : At least one kind Selected from Co, Mn, M_2 : one or more kinds selected from Al, B, Fe, Cr, Mg; $x+y+z=1$, $0.5 < x < 0.95$, $0.01 < y < 0.4$, $0.001 < z < 0.2$. A part of inexpensive Ni contained in the positive electrode active material is substituted by two or more elements to improve cycle characteristics. A negative electrode active material of a mixture of highly **crystalline** graphite and inexpensive coke increases a battery capacity, and suppresses a **crystal** from being collapsed by restricting a movement of a Li ion between both **electrodes** during normal charge and discharge. In addition, **deposition** of a dendrite on the negative electrode at the time of excessive charging is prevented by irreversible large capacity.

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L89 ANSWER 4 OF 18 JAPIO (C) 2003 JPO on STN
AN 1999-016572 JAPIO
TI POSITIVE ELECTRODE MATERIAL FOR LITHIUM SECONDARY BATTERY, AND PREPARATION OF PRECURSOR COMPOSITION THEREOF
IN TAKEYA KANAME; KUBO SHIGEKI
PA SUMITOMO METAL MINING CO LTD
PI JP 11016572 A 19990122 Heisei
AI JP 1997-166797 (JP09166797 Heisei) 19970624
PRAI JP 1997-166797 19970624
SO PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 1999
IC ICM H01M004-58
ICS C01G053-00; H01M004-02; H01M004-04; H01M010-40
AB PROBLEM TO BE SOLVED: To provide a preparation method for a positive **electrode** material for a lithium secondary battery comprising a compound oxide of Li and Ni containing Al of homogeneous solid-solution condition, and having a layer **crystal** structure of excellent thermal stability, and provide a preparation method for a precursor composition with homogeneously dispersed Al used therefor.
SOLUTION: A nickel salt is suspended in water, an alkali salt of an aluminic acid is dissolved in it, and the alkali salt of the aluminic acid is neutralized to deposit an aluminum hydroxide. After a mixture of the deposited aluminum hydroxide and the nickel salt is dried, a lithium salt is added and mixed to prepare a precursor composition 1. The precursor composition is baked in the atmosphere of air containing 1 vol.% or more of ozone, or oxygen to prepare a positive electrode material.
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L89 ANSWER 5 OF 18 JAPIO (C) 2003 JPO on STN
AN 1998-241690 JAPIO
TI LITHIUM SECONDARY BATTERY NEGATIVE ELECTRODE
IN KOJIMA YOSHITSUGU; SHIMIZU YOSHIHIRO; KOIWAI AKIHIKO; SUZUKI NOBUAKI
PA TOYOTA CENTRAL RES & DEV LAB INC
PI JP 10241690 A 19980911 Heisei
AI JP 1997-61920 (JP09061920 Heisei) 19970227
PRAI JP 1997-61920 19970227
SO PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 1998

IC ICM H01M004-58
 ICS H01M004-02

AB PROBLEM TO BE SOLVED: To provide a lithium secondary battery negative electrode having high discharge capacity, low irreversible capacity, and superior cycle characteristic by forming negative electrode active material of specific amount of graphite and the rest, amorphous carbon containing phosphorus, oxygen, and inevitable impurity, and specifying the containing amount range of phosphorus and oxygen with respect to the whole amorphous carbon.
 SOLUTION: Negative electrode active material is formed of graphite with 5 to 50% (i.e., weight%, hereunder the same) and the rest, amorphous carbon containing phosphorus, oxygen, and unavoidable impurity, and the containing amount of phosphorus is in the range of 0.01 to 10%, and the containing amount of oxygen is in the range of 0.01 to 15% with respect to the whole amorphous carbon. The amorphous carbon 1 is made of larger carbon crystal elements 10, which is formed by decomposing and forming one part of the carbon crystal element constituting raw coke through heat. Lithium ions 2 are intercalation between the layers 13 of the layer structure of the carbon crystal elements 10, and lithium clusters 20 formed of lithium ions 2 are stored in cavities 11, formed between the mutual ends 12 of the carbon crystal elements 10, so as to obtain a lithium secondary battery negative electrode having superior cycle characteristic.

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L89 ANSWER 6 OF 18 JAPIO (C) 2003 JPO on STN
 AN 1998-064542 JAPIO
 TI NONAQUEOUS ELECTROLYTE SECONDARY BATTERY
 IN NITTA YOSHIAKI
 PA MATSUSHITA ELECTRIC IND CO LTD
 PI JP 10064542 A 19980306 Heisei
 AI JP 1996-220939 (JP08220939 Heisei) 19960822
 PRAI JP 1996-220939 19960822
 SO PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 1998
 IC ICM H01M004-58
 ICS H01M004-02; H01M010-40

AB PROBLEM TO BE SOLVED: To provide a nonaqueous electrolyte secondary battery in which deposition of needle crystals on the surface of an electrode accompanying charge/ discharge is retarded by using a lithium - silicon oxide represented by a specific formula in a negative electrode.
 SOLUTION: A nonaqueous electrolyte secondary battery comprises a nonaqueous electrolyte, a positive electrode, and a negative electrode using a lithium - silicon oxide represented by a general formula of $Li<SB>x</SB>MSi<SB>2</SB>O<SB>7</SB>$ ($2 \leq x \leq 4$, M is at least one of V, Mn, and Cr). The lithium - silicon oxide using Mn and Cr is prepared in such a way that lithium oxide and silicon dioxide of a stoichiometric composition ratio, and $Cr<SB>3</SB>O<SB>4</SB>$ and/or $Mn<SB>3</SB>O<SB>4</SB>$ of the required amount are put in a ceramic container, and they are melted at about $950^{\circ}C$ under the flow of a mixture gas of argon gas and about 10% oxygen. When V is doped, a composite oxide of Si and V is prepared, lithium oxide is mixed to the silicon - vanadium composite oxide, then the similar process is applied. The nonaqueous electrolyte secondary battery with high capacity is obtained.

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L89 ANSWER 7 OF 18 JAPIO (C) 2003 JPO on STN
 AN 1997-190821 JAPIO

TI LITHIUM SECONDARY BATTERY
IN GOTO AKIHIRO; YOSHIKAWA MASANORI; YAMAUCHI SHIYUUKO
PA HITACHI LTD
HITACHI CHEM CO LTD
PI JP 09190821 A 19970722 Heisei
AI JP 1996-1179 (JP08001179 Heisei) 19960109
PRAI JP 1996-1179 19960109
SO PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 1997
IC ICM H01M004-58
ICS H01M004-02; H01M004-04
AB PROBLEM TO BE SOLVED: To obtain a lithium secondary battery having high energy density and large discharging capacity, by including a conical or pyramid form of graphite powder made by specifying its aspect ratio, and having a layer form structure on the bottom surface, in the carbon material of a negative electrode.
SOLUTION: This lithium secondary battery has a negative electrode consisting of a carbon type material which can intercalate the lithium, a positive electrode, and a nonaqueous electrolyte as the main component elements. To this carbon type material of the negative electrode, a conical or a pyramid form of graphite whose aspect ratio is 1.0 to 1.5, and having a layer form structure on the bottom surface is included more than 10vol%. It is preferable that the graphite powder is the powder crystallized from a solution metal such as iron. The regulation of the mean aspect ratio of the crystallized graphite particles is carried out by regulating the Si including amount in the molten iron less than 2.0%, or by adding a rare earth element unit such as Ca, Mg, or Ce, or their compound, in the molten iron. Consequently, a high speed charging and discharging can be carried out, and a lithium secondary battery with a long cycle life, and an excellent safety, can be obtained.
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L89 ANSWER 8 OF 18 JAPIO (C) 2003 JPO on STN
AN 1997-073893 JAPIO
TI LARGE-CAPACITY ELECTRODE, AND SECONDARY BATTERY USING THE SAME
IN HAYASHI YOSHITAKA; KATO IKUO; OSAWA TOSHIYUKI; KATAGIRI NOBUO; FUJII TOSHIHIGE
PA RICOH CO LTD
PI JP 09073893 A 19970318 Heisei
AI JP 1996-184052 (JP08184052 Heisei) 19960625
PRAI JP 1995-186372 19950629
SO PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 1997
IC ICM H01M004-02
ICS H01M004-58; H01M010-40
AB PROBLEM TO BE SOLVED: To provide an electrode which uses lithium complex oxides, for use in a large-capacity battery, and a secondary battery using the electrode, which has a large energy density and is excellent in cycle characteristic.
SOLUTION: This battery electrode has an active material containing lithium complex oxides, a conductive agent, and a conductive high polymer. The lithium complex oxides occupy 40 to 99wt.% of the total weight including the conductive high polymer. The lithium complex oxides have a maximum particle diameter of 20μm or less and are made to exist uniformly in powder form with an average particle diameter of 10μm or less. Further, the circumference of the particles is covered with the conducting agent and the conductive high polymer. The lithium complex oxides may be complex oxides of lithium and manganese of a spinel crystalline structure. The conducting agent is desirably 1 to 20wt.% of the total weight of the active material. The electrode thus formed is used as a positive electrode, and a negative electrode is formed

from an **intercalated** material into and from which an alkali metal can be inserted and desorbed electrochemically. The figure is a discharge curve of a secondary battery.

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L89 ANSWER 9 OF 18 JAPIO (C) 2003 JPO on STN
AN 1997-007593 JAPIO
TI LITHIUM SECONDARY BATTERY
IN SAITO KEIICHI; MASASHIRO TAKAHISA; TOBISHIMA SHINICHI; YAMAKI JUNICHI
PA NIPPON TELEGR & TELEPH CORP <NTT>
PI JP 09007593 A 19970110 Heisei
AI JP 1995-173027 (JP07173027 Heisei) 19950616
PRAI JP 1995-173027 19950616
SO PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 1997
IC ICM H01M004-38
ICS H01M010-40
AB PURPOSE: To prevent decreasing safety due to repeating a charge/discharge, by using a lithium metal containing conductive non-metal powder incapable of inserting/detaching a lithium ion in a negative **electrode** of a **lithium** secondary battery.
CONSTITUTION: By including conductive non-metal powder incapable of inserting/ detaching a lithium ion in a lithium **metal**, **depositing** lithium is preferentially generated from a contact **surface** with the lithium metal. The conductive non- metal powder incapable of inserting/detaching a lithium ion serves as a nucleus even when deposited, to grow a **crystal**. From this fact, a uniform deposition form as a negative electrode total unit can be realized, to prevent easily generating branch-shaped lithium even when repeated a charge/discharge over a long period. Even in the case of separating by forming the branch-shape lithium, by contact with the conductive non-metal powder which is incapable of inserting/ detaching a lithium ion, since reusing in a charge/discharge can be made, improving a life can be attained.
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L89 ANSWER 10 OF 18 JAPIO (C) 2003 JPO on STN
AN 1996-124559 JAPIO
TI MANUFACTURE OF LITHIUM SECONDARY BATTERY AND OF NEGATIVE ELECTRODE ACTIVE MATERIAL
IN YAMADA KAZUO; MITACHI TAKEHITO; YONEDA TETSUYA; NISHIMURA NAOTO
PA SHARP CORP
PI JP 08124559 A 19960517 Heisei
AI JP 1994-264005 (JP06264005 Heisei) 19941027
PRAI JP 1994-264005 19941027
SO PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 1996
IC ICM H01M004-02
ICS H01M004-48; H01M004-58; H01M010-40
AB PURPOSE: To improve the initial charge/discharge efficiency characteristic.
CONSTITUTION: A lithium secondary battery comprises a positive electrode, negative electrode and a nonaqueous system ion conductor. The negative electrode contains as a negative electrode active material a main negative electrode active material composed of graphite capable of **intercalating/deintercalating** a lithium ion and the second negative electrode active material composed of **copper** oxide, and the second negative electrode active material is a **copper** oxide (II) of low **crystallization**, **copper** oxide (I) obtained by reducing this **copper** oxide (II) of low **crystallization**, and a mixture of the **copper** oxide (II) of low **crystallization** and the **copper** oxide (I), or

lithium-contained **copper** oxide. By using a compound negative electrode of high charge/discharge efficiency in the initial time consisting of this main negative electrode active material and the second negative **electrode** active material, a lithium secondary cell having high capacity further excellent in a cycle characteristic is manufactured.

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L89 ANSWER 11 OF 18 JAPIO (C) 2003 JPO on STN
AN 1995-288130 JAPIO
TI NEGATIVE ELECTRODE ALLOY FOR LITHIUM SECONDARY BATTERY AND LITHIUM SECONDARY BATTERY
IN TAKADA YOSHINORI; SASAKI KOZO; MARUMOTO MITSUHIRO
PA MITSUBISHI CABLE IND LTD
PI JP 07288130 A 19951031 Heisei
AI JP 1995-34126 (JP07034126 Heisei) 19950222
PRAI JP 1994-49869 19940222
SO PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 1995
IC ICM H01M004-40
ICS H01M004-02; H01M010-40
AB PURPOSE: To enhance electromotive force, charging/discharging capacity, energy density, and lengthen charging/discharging cycle life by using a Li-Ag-Te system alloy having a specified composition range in a negative electrode.
CONSTITUTION: The composition of a negative electrode alloy is preferably represented by formulas I, II, and III. By the γ - Li_1Te phase of a Li-Ag system alloy, which relates to absorption/desorption of lithium, of a Li-Ag-Te system alloy, discharging capacity is maintained for a long time and charging/discharging cycle life is lengthened. By an intermetallic compound such as Ag_2Te and Li_2Te , **crystal** grains are made fine, diffusion of lithium and silver is accelerated, absorption/desorption efficiency of lithium is enhanced. By containing M1-M2 system alloy composition represented by formula IV, deterioration of negative electrode attendant on absorption/desorption of lithium is retarded by the binding effect of this intermetallic compound. Alloying is made by conventional melting process or vapor deposition process. (In formula IV, M1 is a 3B-5B group metal, and M2 is a transition metal excluding Ag).
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L89 ANSWER 12 OF 18 JAPIO (C) 2003 JPO on STN
AN 1995-130395 JAPIO
TI NONAQUEOUS ELECTROLYTE SECONDARY BATTERY
IN MIYASAKA TSUTOMU; KAGAWA OKIMASA
PA FUJI PHOTO FILM CO LTD
PI JP 07130395 A 19950519 Heisei
AI JP 1993-273809 (JP05273809 Heisei) 19931101
PRAI JP 1993-273809 19931101
SO PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 1995
IC ICM H01M010-40
ICS H01M004-02; H01M004-50; H01M004-58
AB PURPOSE: To improve discharge capacity, charge/discharge cycle performance and safety by using transition metal composite oxide as negative **electrode** active material, spinel **lithium** manganese composite oxide as positive electrode active material and nonaqueous solution as electrolyte.
CONSTITUTION: An nonaqueous electrolyte secondary battery is formed basically with positive electrode active material, negative **electrode** active material and **lithium** salt containing nonaqueous electrolyte. In the positive electrode active

material, spinel structure lithium containing manganese oxide shown as $\text{Li}^{1+x}[\text{Mn}^{2-y}]O_4$ ($0 \leq x < 1.7$, $0 < y < 0.7$) is contained. The negative electrode active material is obtained by intercalating lithium ions in transition metal oxide which may contain lithium. In such a case, the intercalation of the lithium ions is performed until the basic crystal structure of the transition metal oxide is changed (a X-ray diffraction pattern is changed). The intercalation is kept until the basic crystal structure of the lithium ions containing transition metal oxide after intercalated is substantially unchanged condition during charging and discharging (the X-ray diffraction pattern is substantially unchanged).

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L89 ANSWER 13 OF 18 JAPIO (C) 2003 JPO on STN
AN 1994-150930 JAPIO
TI NON-AQUEOUS SECONDARY BATTERY
IN YAMADA KAZUO; MITACHI TAKEHITO; YONEDA TETSUYA
PA SHARP CORP
PI JP 06150930 A 19940531 Heisei
AI JP 1992-302424 (JP04302424 Heisei) 19921112
PRAI JP 1992-302424 19921112
SO PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 1994
IC ICM H01M004-58
ICS H01M004-02; H01M010-40
AB PURPOSE: To provide a non-aqueous secondary battery having large capacity by making carbon material to include particles each having substantially spherical structure body or their aggregate so that each of the particles has an imperfect crystal structure and its diameter is less than 5 micro-m.
CONSTITUTION: In a non-aqueous secondary battery which is sealed in condition that an non-aqueous electrolyte is interposed between a positive electrode and a negative electrode and in which the active material of the negative electrode is formed of carbon material, the carbon material is made to include particles each having substantially spherical structure body or their aggregate so that each of the particles has an imperfect crystal structure and its diameter is less than 5 micro-m. Thus, lithium has a large effective area in contact with electrolyte in the case of electrode reaction and the lithium easily intercalates or deintercalates between laminated carbon layers of hexagon mesh face so that the ratio of the carbon used increases to make the battery to have a large capacity. In the case of using such as carbon as having a concentric spherical structure (onion-shaped structure) of which fine structure is not perfect, lithium diffuses to the carbon easily, the ratio of carbon used increases and a carbon negative electrode having a large capacity is used, thereby the battery is made to have the large capacity.

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L89 ANSWER 14 OF 18 JAPIO (C) 2003 JPO on STN
AN 1994-150928 JAPIO
TI NON-AQUEOUS ELECTROLYTE SECONDARY BATTERY
IN WATANABE SHOICHIRO; SUGIMOTO TOYOJI
PA MATSUSHITA ELECTRIC IND CO LTD
PI JP 06150928 A 19940531 Heisei
AI JP 1992-299517 (JP04299517 Heisei) 19921110
PRAI JP 1992-299517 19921110
SO PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 1994
IC ICM H01M004-58

ICS H01M004-02; H01M010-40

AB PURPOSE: To make a non-aqueous electrolyte secondary battery have high voltage and high energy density and improve its charge and discharge cycle life time characteristic and storage ability by using lithium composite oxide the faces of whose particles are covered by samarium oxide, etc., as a positive electrode active material.

CONSTITUTION: Lithium composite oxide $\text{Li} <\text{SB}> (1-x) </\text{SB}$
 $>\text{CoO} <\text{SB}> 2 </\text{SB}>$ ($0 \leq x \leq 1$) or $\text{Li} <\text{SB}> (1-x) </\text{SB}$
 $>\text{SB}> \text{CoMoO}_4 <\text{SB}> 2 </\text{SB}>$ (wherein M is transition metal except Co and $0 \leq x \leq 1$) the faces of whose particles are covered by samarium oxide or composite oxide is used as a positive electrode active material. A non-aqueous electrolyte secondary battery formed of a group of polarity plates, etc., is constructed by the positive electrode, lithium and a negative electrode made of carbon material capable of intercalating or deintercalating lithium alloy or lithium, etc. Since direct reaction between the surfaces of a positive active material particles and electrolyte is suppressed and decomposition reaction of the electrolyte on the positive electrode active material and crystal disintegration of the positive electrode active material can be prevented under high voltage, charge and discharge cycle life time characteristic and storage ability can be improved as a battery.

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L89 ANSWER 15 OF 18 JAPIO (C) 2003 JPO on STN

AN 1994-124707 JAPIO

TI NONAQUEOUS ELECTROLYTIC BATTERY

IN NITTA YOSHIAKI; HARAGUCHI KAZUNORI; KOBAYASHI SHIGEO; OKAMURA KAZUHIRO

PA MATSUSHITA ELECTRIC IND CO LTD

PI JP 06124707 A 19940506 Heisei

AI JP 1992-274690 (JP04274690 Heisei) 19921014

PRAI JP 1992-274690 19921014

SO PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 1994

IC ICM H01M004-58

ICS H01M004-02; H01M010-40

AB PURPOSE: To provide a battery having enhanced charge and discharge characteristics by using a composite oxide substituted with a three-dimensional transition element satisfying a specific chemical formula.

CONSTITUTION: A composite oxide is substituted with a transition element satisfying an expression of $\text{Li} <\text{SB}> y </\text{SB}> \text{Ni} <\text{SB}> 1-x </\text{SB}> \text{Me} <\text{SB}> x </\text{SB}> \text{O} <\text{SB}> 2 </\text{SB}>$ (where Me: one transition metal of Cu,

Zn and Ag, and $1.0 \leq y \leq 1.3$), having the crystal structure of a hexagonal system where the value of (x) is in the range of 0.01 to 0.05 when Me is Cu and Ag, and in the range of 0.05 to 0.2 when Me is Zn, and further having such a lattice constants identified from an X-ray diffraction chart as $a <\text{SB}> 0 </\text{SB}>$ between 2.85 and 2.89 \AA , $c <\text{SB}> 0 </\text{SB}>$ between 14.20 and 14.30. Then, this composite oxide is used as an active material for a positive electrode. A secondary battery is constituted of the positive electrode, a negative electrode of lithium, lithium alloy or such carbon material as allowing the intercalation of lithium, and a nonaqueous electrolyte. Thus, a nonaqueous electrolytic secondary battery with enhanced charge and discharge characteristics can be provided, as the specific composite compound is used as the positive electrode.

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L89 ANSWER 16 OF 18 JAPIO (C) 2003 JPO on STN

AN 1993-314977 JAPIO
TI NONAQUEOUS ELECTROLYTIC SECONDARY BATTERY
IN KOBAYASHI SHIGEO; HARAGUCHI KAZUNORI; MORIGAKI KENICHI; NITTA YOSHIAKI;
TERAOKA TAKAHIRO
PA MATSUSHITA ELECTRIC IND CO LTD
PI JP 05314977 A 19931126 Heisei
AI JP 1992-117226 (JP04117226 Heisei) 19920511
PRAI JP 1992-117226 19920511
SO PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 1993
IC ICM H01M004-58
ICS H01M010-40
AB PURPOSE: To increase capacity and improve cycle characteristics by using a carbon material with a Fulleren crystal structure of nodular molecules as a negative electrode.
CONSTITUTION: An electrode plate group 4 in a case 1 comprises positive and negative electrodes spirally wound by a plurality of turns via a separator. A carbon material of a Fulleren crystal structure of nodular molecules constituted of a hexagon having six carbon atoms and a pentagon having five carbon atoms, is used as a negative electrode. Consequently, a lithium amount intercalated and de-intercalated with carbon increases.
Also, as the carbon has a nodular crystal structure, the negative electrode becomes strong, compared with the case of a laminar structure, and a battery having large capacity and excellent cycle characteristics can be provided. Also, the nodular molecules are constituted of 60, 70, 76 and 84 carbon atoms.
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L89 ANSWER 17 OF 18 JAPIO (C) 2003 JPO on STN
AN 1991-190053 JAPIO
TI MANUFACTURE OF ELECTRODE
IN YOSHIMOTO YOSHIKAZU; WADA HIROSHI; YOSHIDA MASARU; NAKAJIMA SHIGEO
PA SHARP CORP
PI JP 03190053 A 19910820 Heisei
AI JP 1989-329880 (JP01329880 Heisei) 19891219
PRAI JP 1989-329880 19891219
SO PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 1991
IC ICM H01M004-04
ICS H01M004-02; H01M010-40
AB PURPOSE: To obtain a negative electrode having large capacity density and a flat discharge curve by bringing pyrolytic carbon, obtained by gas-phase decomposition of hydrocarbons, into contact with lithium vapor to form an intercalation compound and using the pyrolytic carbon for an electrode.
CONSTITUTION: Pyrolytic carbon is produced by gas-phase heat decomposition of hydrocarbons such as aliphatic hydrocarbon, aromatic hydrocarbon, and alioylic hydrocarbon. The pyrolytic carbon is brought into contact with lithium vapor to form an intercalation compound of the pyrolytic carbon and lithium, then the pyrolytic carbon is used for an electrode. By this process, lithium is uniformly doped in the highly crystallized component and activated. The negative electrode for a lithium secondary battery having large capacity density and a flat discharge curve is obtained.
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L89 ANSWER 18 OF 18 JAPIO (C) 2003 JPO on STN
AN 1983-108669 JAPIO
TI SOLID ELECTROLYTE BATTERY
IN MOCHIZUKI MASAJI; NAGAI TATSU
PA HITACHI MAXELL LTD

PI JP 58108669 A 19830628 Showa
AI JP 1981-206763 (JP56206763 Showa) 19811221
PRAI JP 1981-206763 19811221
SO PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 1983
IC ICM H01M006-18
ICS H01M004-58; H01M004-62
AB PURPOSE: To increase cathode utilization and improve a cathode reaction by forming a cathode having the mixture of TiS₂ powder and solid electrolyte powder as an active mass on one side of a solid electrolyte.
CONSTITUTION: Single **crystals** of TiS₂ are **deposited** on a quartz plate by a C.V.D method and others.
Li₃N-LiI compound which is solid electrolyte powder is mixed with this single **crystal** TiS₂ powder and this mixture is molded to form a **cathode** 1. Li₃N-LiI compound is formed as a solid electrolyte 3 on the cathode 1. An anode is formed on the electrolyte 3 by vapor depositing of Li or press-bonding of Li foil. A **cathode** plate 4 and an anode plate 5 are fixed on these electrodes to form a battery. In this solid electrolyte battery, Li⁺ ion acts effectively with TiS₂, especially when TiS₂ is single **crystal**, utilization of the cathode active mass is increased and excellent discharge performance is obtained.
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=> d L108 all

L108 ANSWER 1 OF 7 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN
AN 2002-659538 [71] WPIX
DNN N2002-521226 DNC C2002-185526
TI Lithium cell, useful e.g. in button cell or rechargeable lithium-polymer, has metal foil conductor with electrochemically deposited **crystallites** of same or different metal on **surface**.
DC E13 L03 X16
IN BIRKE, P; HAUG, P; HOLL, K; ILIC, D
PA (MICR-N) MICROBATTERIE AG; (VART) VARTA GERAETEBATTERIE GMBH; (MICR-N) MICROBATTERIE GMBH; (BIRK-I) BIRKE P; (HAUG-I) HAUG P; (HOLL-I) HOLL K; (ILIC-I) ILIC D
CYC 30

PI EP 1235286 A2 20020828 (200271)* DE 6p H01M004-02 <--
 R: AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT
 RO SE SI TR
 DE 10108695 A1 20020905 (200271) H01M004-38 <--
 US 2002119376 A1 20020829 (200271) H01M004-66 <--
 JP 2002304998 A 20021018 (200301) 5p H01M004-66 <--
 CN 1372342 A 20021002 (200307) H01M004-64 <--
 KR 2002069099 A 20020829 (200309) H01M004-38 <--
 ADT EP 1235286 A2 EP 2002-1556 20020123; DE 10108695 A1 DE 2001-10108695
 20010223; US 2002119376 A1 US 2002-79003 20020220; JP 2002304998 A JP
 2002-43644 20020220; CN 1372342 A CN 2002-105123 20020222; KR 2002069099 A
 KR 2001-78732 20011213
 PRAI DE 2001-10108695 20010223
 IC ICM H01M004-02; H01M004-38; H01M004-64;
 H01M004-66
 ICS H01M004-70; H01M006-16; H01M010-40
 AB EP 1235286 A UPAB: 20021105
 NOVELTY - Providing a galvanic cell with lithium-intercalating electrode(s), in which the electrochemically active material is applied to a metal foil conductor.
 DETAILED DESCRIPTION - In a galvanic cell with lithium-intercalating electrode(s), in which the electrochemically active material is applied to a metal foil conductor, the surface of the metal foil is provided with electrochemically deposited crystallites of a second or identical metal, which enlarges the area of contact and reduces the contact resistance to the active material.
 USE - The cells are useful e.g. as button cells and rechargeable lithium-polymer batteries.
 ADVANTAGE - Loss of contact between the conductor and electrochemically active composition is the most frequent cause of failure of galvanic cells. Expanded metal conductors are normally used in rechargeable lithium polymer cells but require costly coating with primer to ensure satisfactory adhesion of the electrodes. The crystallite layer increases the adhesion and eliminates the need to use expanded metal and primer.
 Dwg.0/2
 FS CPI EPI
 FA AB; DCN
 MC CPI: E06-D08; L03-E01B5B
 EPI: X16-E03A1; X16-E08A

=> d L108 2-7 all

L108 ANSWER 2 OF 7 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN
 AN 1999-179954 [15] WPIX
 DNN N1999-132190 DNC C1999-052330
 TI Treated carbon fibers - by catalytic etching of mesophase fibers to selectively remove hard carbon shell.
 DC L03 X16
 IN CHU, X; KINOSHITA, K
 PA (REGC) UNIV CALIFORNIA
 CYC 1
 PI US 5874166 A 19990223 (199915)* 15p H01M004-58 <--
 ADT US 5874166 A US 1996-708151 19960822
 PRAI US 1996-708151 19960822
 IC ICM H01M004-58
 AB US 5874166 A UPAB: 19990416
 NOVELTY - Hard carbon shells (35) on mesophase carbon fibers are selectively removed by depositing catalytic metal

particles on the shell to form etch sites (36). Etching then exposes the edges (38) of graphitic layers (36) which act as reversible electrode sites. DETAILED DESCRIPTION - A mesophase carbon fiber comprises a hard carbon shell, 0.01-0.1 μ thick, which is treated to remove 1-80% of the shell to expose sufficient edges of the underlying plates to form a carbon electrode having a reversible capacity of at least 170 mAh/g. Other portions of the shell remain to impart physical strength and integrity. INDEPENDENT CLAIMS are also included for the following: (a) a carbon structure comprising radial carbon plates with exposed surface edges as above, and (b) a method of forming the above comprising forming catalyst sites on the hard shell and selectively etching around these to expose the edges above.

USE - As treated carbon fibers for reversible carbon electrodes for, e.g., lithium and oxygen cells

ADVANTAGE - Electrodes formed from the fibers have high charge and discharge capacity and reversibility, good mechanical strength and corrosion resistance DESCRIPTION OF DRAWING(S) - The drawing shows an isometric view of the carbon fiber after loading with catalyst. (34) Shell; (35) Catalyst sites; (36) Graphite plates; (38) Edges.

Dwg.3/10

FS CPI EPI

FA AB; GI

MC CPI: L03-E01B3

EPI: X16-E01A; X16-E01G; X16-E08A

L108 ANSWER 3 OF 7 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN

AN 1995-267007 [35] WPIX

DNN N1995-205021 DNC C1995-121329

TI Crystalline lithium deposited on cathode base by electrolysis - using electrolyte contg tetra hydro furan deriv and/or 1,3-dioxolane as solvent.

DC E13 L03 M11 X16

IN MATSUI, T; TAKEYAMA, K

PA (MATU) MATSUSHITA DENKI SANGYO KK; (MATU) MATSUSHITA ELEC IND CO LTD

CYC 2

PI JP 07169460 A 19950704 (199535)* 10p H01M004-02 <--

US 5558953 A 19960924 (199644) 12p H01M006-14

JP 3202880 B2 20010827 (200152) 12p H01M004-02 <--

ADT JP 07169460 A JP 1994-255373 19941020; US 5558953 A US 1994-319761
19941007; JP 3202880 B2 JP 1994-255373 19941020

FDT JP 3202880 B2 Previous Publ. JP 07169460

PRAI JP 1993-263411 19931021

IC ICM H01M004-02; H01M006-14

ICS C25C001-02; H01M004-04; H01M004-40;

H01M004-58; H01M010-40

AB JP 07169460 A UPAB: 19950905

The crystalline lithium metal has a polygonal surface deposited on a cathode metal base due to the electrolysis of a lithium ion conductive electrolyte.

Also claimed is the prepn. of the crystalline lithium metal by: (a) facing a material for electrochemically releasing a lithium ion and a metal base in a non-aq. lithium ion conductive electrolyte contg. a THF deriv. of formula (I) and/or 1,3-dioxolane deriv. of formula (II) as solvent and (b) supplying a cathodic electric current to the metal base to deposit lithium on the metal base. In formulae (I) and (II), R₁ = C_mH_{2m+1}; R₂ = C_nH_{2n+1}; m and n are not simultaneously 0.

Also claimed is a lithium storage battery comprising: (a) rechargeable positive electrodes; (b) negative electrodes consisting of the metal base having deposited lithium; and

(c) non-aq. lithium ion conductive electrolyte.

ADVANTAGE - The **crystalline** lithium metal is thin c.f. conventional **crystalline** lithium metals and is used as electrode foil. The use of the **crystalline lithium** metal gives the negative **electrodes** having less generation of dendrite and high charge and discharge efficiency. The resulting lithium storage battery has high safety, prolonged charge and discharge cycle life, and high reliability.

Dwg.0/5

FS CPI EPI
FA AB; GI; DCN
MC CPI: E07-A02E; E07-A04; L03-E01B5; M11-A06
EPI: X16-B01F1; X16-E01C; X16-E01G

L108 ANSWER 4 OF 7 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN
AN 1995-173461 [23] WPIX
DNN N1995-135980 DNC C1995-080463
TI Negative **electrode** for lithium sec. batteries - includes elements with large electronegativity and lithium with low electronegativity, and lithium ions distributed in matrix form.
DC L03 X16
IN HASEGAWA; SUZUKI, K
PA (NPDE) NIPPONDENSO CO LTD
CYC 2
PI JP 07094186 A 19950407 (199523)* 3p H01M004-40 <--
US 5498764 A 19960312 (199616) 5p H01M004-38 <--
ADT JP 07094186 A JP 1993-236257 19930922; US 5498764 A US 1994-308491
19940921
PRAI JP 1993-236257 19930922
IC ICM H01M004-38; H01M004-40
ICS H01M004-02; H01M004-36
AB JP 07094186 A UPAB: 19950619
The negative electrode is composed of elements with large electronegativity and lithium metal with low electronegativity. The lithium ions are distributed in the form of a matrix. The lithium metal is deposited selectively on a charging part. A charging curvature part and multiple liq. crystal nuclei are formed. The deposition of lithium is continued until a lithium layer is formed.

ADVANTAGE - Restrains growth of dendrite **crystal**. Lengthens charging and discharging life time.

Dwg.0/0

FS CPI EPI
FA AB; GI
MC CPI: L03-E01B5
EPI: X16-B01F1; X16-E01C

L108 ANSWER 5 OF 7 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN
AN 1993-312892 [40] WPIX
DNN N1993-240930 DNC C1993-139045
TI Mfr. of carbon composite electrode material - by coating highly **crystalline** carbon particles with metal and adding an outer carbon layer having a turbulent **crystal** structure.
DC E36 L03 X16
IN MITATE, T; TANAKA, H; YAMADA, K; YOSHIKAWA, M
PA (SHAF) SHARP KK
CYC 5
PI EP 555080 A1 19930811 (199340)* EN 10p H01M004-96 <--
R: DE FR GB
JP 05299073 A 19931112 (199350) 6p H01M004-02 <--

EP 555080 B1 19960515 (199624) EN 10p H01M004-96 <--
 R: DE FR GB
 DE 69302596 E 19960620 (199630) H01M004-96 <--
 US 5595838 A 19970121 (199710) 8p C25B011-04
 US 5776610 A 19980707 (199834) # B32B005-16
 JP 2999085 B2 20000117 (200008) 6p H01M004-02 <--

ADT EP 555080 A1 EP 1993-300813 19930204; JP 05299073 A JP 1993-17598
 19930204; EP 555080 B1 EP 1993-300813 19930204; DE 69302596 E DE
 1993-602596 19930204, EP 1993-300813 19930204; US 5595838 A Cont of US
 1993-13029 19930203, US 1994-323572 19941017; US 5776610 A Div ex US
 1993-13029 19930203, Div ex US 1994-323572 19941017, US 1996-729170
 19961011; JP 2999085 B2 JP 1993-17598 19930204

FDT DE 69302596 E Based on EP 555080; US 5776610 A Div ex US 5595838; JP
 2999085 B2 Previous Publ. JP 05299073

PRAI JP 1992-17969 19920204; US 1996-729170 19961011

REP EP 239410; EP 334501; EP 346088; EP 419090

IC ICM B32B005-16; C25B011-04; H01M004-02; H01M004-96
 ICS C01B031-04; H01M004-04; H01M004-58; H01M010-40

AB EP 555080 A UPAB: 19960731
 C composite electrode is mfd. by: coating C particles of high
crystallinity with a film contg. a Gp. VIII metal; and coating the
 resulting particles with a C layer by hydrocarbon (deriv.) pyrolysis.
 Pref. Gp. VIII metal is Ni, Co or Fe or an alloy of these.
 USE/ADVANTAGE - As the negative **electrode** active material
 in Li sec. batteries. (claimed) A C composite of high
surface area and high core **crystallinity** is formed and
 at a relatively low temp.

Dwg.1/3
 Dwg.1/3

FS CPI EPI

FA AB; GI; DCN

MC CPI: E31-N03; L03-E01B3
 EPI: X16-B01F1; X16-E01G

L108 ANSWER 6 OF 7 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN

AN 1993-213691 [26] WPIX

DNN N1993-164353 DNC C1993-094742

TI Anode for rechargeable lithium cell - comprises
 lithium magnesium silicide material which intercalates to form single
crystal or amorphous phases.

DC L03 M26 X16

IN ATTIA, A I; HALPERT, G; HUANG, C; SURAMPUDI, S; ATTIA, A

PA (USAS) NASA US NAT AERO & SPACE ADMIN

CYC 1

PI US 959858 A0 19930601 (199326)* 16p H01M000-00
 US 5294503 A 19940315 (199411) 9p H01M004-58 <--

ADT US 959858 A0 US 1992-959858 19921013; US 5294503 A US 1992-959858 19921013

PRAI US 1992-959858 19921013

IC ICM H01M000-00; H01M004-58

AB US N7959858 N UPAB: 20030312
 Battery includes an $\text{Li}_{x}\text{Mg}_2\text{Si}$ anode which intercalates Li
 to form a single **crystal** phase when x is up to 1.0 and an
 amorphous phase when x is 1.0-2.0. The battery has an organic electrolyte.
 Cell pref. comprises an anode layer of $\text{Li}_{x}\text{Mg}_2\text{Si}$ deposited
 on an Ni screen current collector; a separator element; and a
 cathode layer formed of a polymer binder contg. a dispersion of
 chalcogenide or oxide particles such as TiS_2 or $\text{Li}_{x}\text{CoO}_2$ pressed into an
 expanded Ni sheet. The $\text{Li}_{x}\text{Mg}_2\text{Si}$ material may also include 0.1-1M Ag
 based on Li. A pref. suitable electrolyte is an 0.5-3.0 M salt
 dissolved in an organic electrolyte, e.g. 1M LiAsF in 10% EC + 90% 2MeTHF.

USE/ADVANTAGE - Anode has good electrolyte stability, large Li storage capacity, good reversibility and good mechanical strength even after cycling.

Dwg.1/8

FS CPI EPI
FA AB; GI
MC CPI: L03-E01B5; M26-B
EPI: X16-E01C; X16-E08A

L108 ANSWER 7 OF 7 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN
 AN 1989-207963 [29] WPIX
 DNN N1989-158595 DNC C1989-092262
 TI Aluminium electroconductive polymer composite electrode - for sec cell,
 based on aluminium with specified crystal face giving
 good bond.
 DC A26 A85 L03 P73 X12 X16
 IN KABATA, T; KIMURA, O; OHSAWA, T
 PA (RICO) RICOH KK
 CYC 4
 PI DE 3841924 A 19890713 (198929)*
 JP 01157060 A 19890620 (198930)
 FR 2624526 A 19890616 (198931)
 US 4886572 A 19891212 (199007) 13p
 JP 02043266 A 19900213 (199012)
 DE 3844875 A1 19930401 (199314) H01M004-60 <--
 DE 3844940 A1 19950302 (199514) H01M004-60 <--
 DE 3841924 C2 19951012 (199545) 12p H01M004-60 <--
 DE 3844875 C2 19960905 (199640) 16p H01M004-60 <--
 JP 2669672 B2 19971029 (199748) 816p C08L101-00
 DE 3844940 C2 20000203 (200011) H01M004-60 <--
 ADT DE 3841924 A DE 1988-3841924 19881213; FR 2624526 A FR 1988-16403
 19881213; US 4886572 A US 1988-283605 19881213; DE 3844875 A1 Div ex DE
 1988-3841924 19881213, DE 1988-3844875 19881213; DE 3844940 A1 Div ex DE
 1988-3841924 19881213, DE 1988-3844940 19881213; DE 3841924 C2 DE
 1988-3841924 19881213; DE 3844875 C2 Div ex DE 1988-3841924 19881213, DE
 1988-3844875 19881213; JP 2669672 B2 JP 1988-298253 19881128; DE 3844940
 C2 Div ex DE 1988-3841924 19881213, DE 1988-3844940 19881213
 FDT DE 3844875 A1 Div ex DE 3841924; DE 3844940 A1 Div ex DE 3841924; DE
 3841924 C2 Div in DE 3844875; DE 3844875 C2 Div ex DE 3841924; JP 2669672
 B2 Previous Publ. JP 02043266; DE 3844940 C2 Div ex DE 3841924
 PRAI JP 1987-314165 19871214; JP 1988-83971 19880407; JP 1988-298253
 19881128
 IC ICM C08L101-00; H01M004-60
 ICS B23H003-00; B32B015-08; B44C001-22; C08G061-10; C08G061-12;
 C08G073-02; C08G085-00; C08K003-08; C23F001-00; C25B003-10;
 C25B009-00; C25D009-02; C25D013-08; H01M004-02;
 H01M004-04; H01M004-38; H01M004-66
 AB DE 3841924 A UPAB: 19930923
 In a composite of Al and an electroconductive polymer (I), the
 surface of the Al to which (I) is bonded has a predominantly (HOO)
 crystal face (H = 1, 2, 4).
 (I) is (substd.) polyaniline (IA). (I) is deposited by electrolytic
 deposition on an Al redn. electrode with (HOO)
 surface. This surface may be etched first. (I) is
 depositing by contacting the oxidised form with a reducing medium, which
 may be a nonmetal or metal. (IA) is deposited on an
 Al electrode at +0.75 to +0.95 V vs. SCE in 3-6 N aq. acid (mixt.)
 contg. H₂SO₄, HCl and/or HBF₄.
 USE/ADVANTAGE - The composite is claimed for use in a sec. cell,
 pref. as positive electrode in a cell with a non-aq. electrolyte and a

negative **electrode** having Li (alloy) as active substance. The bond between the Al anode (I) and the impedance at the interface are improved. The sec. cell has high capacity, high energy density and excellent stability for repeated charge/discharge. 816pp Dwg.No.1,2/5)

FS CPI EPI GMPI

FA AB; GI

MC CPI: A05-J11; A09-A03; A12-B04; A12-E06A; L03-E01B8; L03-E01B9; L03-E03
EPI: X12-D01C; X16-B01X; X16-E01

=> d L109 1-18 ti

L109 ANSWER 1 OF 18 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN

TI **Electrode** film used in lithium-ion battery, includes laminated film with two layers of different heat resistance property, and has fine permeation holes formed on lower **surface** of laminated film.

L109 ANSWER 2 OF 18 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN

TI Electrochemical cell for electrochemistry and battery technology, includes negative electrode with ternary alloy layer of lithium and two other metals.

L109 ANSWER 3 OF 18 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN

TI **Electrode** for rechargeable lithium battery, includes surface coating layer provided on **surface** of active material layer.

L109 ANSWER 4 OF 18 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN

TI **Anode** for electrochemical cell comprises lithium metal layer, and metal-lithium alloy layer.

L109 ANSWER 5 OF 18 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN

TI Anode formation for primary, secondary electrochemical cell, involves **depositing** active layer comprising lithium metal (foil) and multi-layer structure of single ion conducting layers and polymer layers on **substrate**.

L109 ANSWER 6 OF 18 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN

TI Method of manufacturing **electrodes** for lithium secondary cell.

L109 ANSWER 7 OF 18 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN

TI Preparation of anode of electrochemical cell includes **depositing** temporary protective metal layer on lithium metal layer.

L109 ANSWER 8 OF 18 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN

TI Multilayer electric current producing cell preparing method involves pressing multilayered subassembly of anode, separator and cathode to form prismatic subassembly.

L109 ANSWER 9 OF 18 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN

TI Fabrication of active metal electrode used as negative **electrodes** in batteries such as lithium **electrodes** in lithium-sulfur batteries.

L109 ANSWER 10 OF 18 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN

TI Formation of vanadium oxide film on **substrate** used as **cathode** in lithium-ion battery.

L109 ANSWER 11 OF 18 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN
TI Lithium secondary battery - has cathode active material coating layer in which occlusion/release of lithium ion is possible, on nickel coating which is deposited over copper (alloy) base material.

L109 ANSWER 12 OF 18 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN
TI Electrode, pref. for a secondary lithium cell - comprises a support having a plastic network substrate with open cells with a metal layer on the network surface and a supported active material.

L109 ANSWER 13 OF 18 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN
TI Non-aqueous electrolyte secondary battery for communication apparatus - has anode obtained by coating anode active material at specific portions of metal deposition film formed on plastic substrate.

L109 ANSWER 14 OF 18 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN
TI Lithium secondary battery - has cathode consisting of graphite layer deposited on iron substrate NoAbstract Dwg 1/3.

L109 ANSWER 15 OF 18 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN
TI Assembling constituents of electrochemical generator - based on thin films of lithium or its alloy and of polymeric electrolyte.

L109 ANSWER 16 OF 18 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN
TI Long life alloy electrode base for lithium storage battery - comprises aluminium film deposited on iridium or tin sheet NoAbstract NoDwg.

L109 ANSWER 17 OF 18 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN
TI Current collector for sulphide contg. positive electrode - for electrochemical cell, has surface reacting with sulphur at cell voltage.

L109 ANSWER 18 OF 18 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN
TI Lattice for lead storage battery electrode - made of lead alloy with lithium deposited on and diffused into surface layers.

=> d L109 1-19 all

L109 ANSWER 1 OF 18 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN
AN 2003-573342 [54] WPIX
DNN N2003-455878
TI Electrode film used in lithium-ion battery, includes laminated film with two layers of different heat resistance property, and has fine permeation holes formed on lower surface of laminated film.
DC X16
PA (KAKO-N) KAKOGAWA PLASTICS KK; (PANA-N) PANAC KK
CYC 1
PI JP 2003197198 A 20030711 (200354)* 7p H01M004-64 <--
ADT JP 2003197198 A JP 2001-393825 20011226
PRAI JP 2001-393825 20011226
IC ICM H01M004-64

AB ICS H01M002-16; H01M004-02; H01M010-40
JP2003197198 A UPAB: 20030821
NOVELTY - A collector film (5) which consists of a metal vapor deposition film, is patterned on the surface of a laminated film (3). The laminated film consists of two layers (1,2) with different heat resisting property, on its upper surface. The fine permeation holes (4) are provided to the other surface of the laminated film.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for the following:

- (1) battery element; and
- (2) laminated non-aqueous battery.

USE - Electrode film used in laminated non-aqueous battery (claimed) e.g. lithium-ion battery.

ADVANTAGE - Since laminated film consists of layers of different heat resistance properties, thin-shape of electrode is obtained and safety is improved with respect to overall heat generation of the lithium-ion battery.

DESCRIPTION OF DRAWING(S) - The figure shows the partial top views and a sectional view of the electrode film in the battery.

low heat resistance layer 1
high heat resistance layer 2
laminated film 3
fine permeation holes 4
collector film 5

Dwg.3/11

FS EPI

FA AB; GI

MC EPI: X16-B01F; X16-E01; X16-E02; X16-F02

L109 ANSWER 2 OF 18 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN

AN 2003-361779 [34] WPIX

CR 1996-268819 [27]; 1997-558117 [51]; 1998-446053 [38]; 1998-541733 [46];
1999-302578 [25]; 2000-181181 [16]; 2000-222629 [19]; 2001-090475 [10];
2001-581771 [65]; 2002-436022 [46]

DNN N2003-288872 DNC C2003-095411

TI Electrochemical cell for electrochemistry and battery technology, includes negative electrode with ternary alloy layer of lithium and two other metals.

DC A85 L03 M11 X16

IN CHU, M; NIMON, Y S; VISCO, S J

PA (POLY-N) POLYPLUS BATTERY CO

CYC 1

PI US 2002182508 A1 20021205 (200334)* 22p C25C007-00

ADT US 2002182508 A1 Cont of US 1998-148024 19980903, CIP of US 2000-480286
20000110, CIP of US 2000-713997 20001115, US 2002-189881 20020703

FDT US 2002182508 A1 Cont of US 6017651, CIP of US 6165644

PRAI US 2002-189881 20020703; US 1998-148024 19980903; US 2000-480286
20000110; US 2000-713997 20001115

IC ICM C25C007-00

ICS C25B009-00; H01M004-40; H01M004-58

AB US2002182508 A UPAB: 20030529

NOVELTY - An electrochemical cell comprises:

(i) a positive electrode (100) including sulfur, lithium sulfide, and/or lithium polysulfide; and

(ii) a negative electrode having a ternary alloy layer comprising lithium, a first and a second metal.

The first metal accommodates volume changes in the ternary alloy during lithium cycling. The second metal alloys with lithium and the first metal.

DETAILED DESCRIPTION - An electrochemical cell comprises:

- (i) a positive **electrode** (100) including sulfur, lithium sulfide, and/or lithium polysulfide; and
- (ii) a negative electrode having a ternary alloy layer comprising lithium, a first and a second metal.

The first metal provides a matrix that accommodates volume changes in the ternary alloy during lithium cycling. The second metal alloys with lithium and the first metal and increases lithium cycling efficiency and **anode** stability towards electrolyte components during storage. INDEPENDENT CLAIMS are also included for:

(a) an anode for use in an electrochemical cell comprising a lithium metal layer and a ternary alloy layer;

(b) a method of forming a lithium anode with a metal-lithium alloy layer for an electrochemical cell, comprising depositing two metal layers on outer surface of the lithium foil, and alloying the two metal layers to form a ternary alloy layer comprising lithium and the metals; and

(c) a battery cell comprising a positive anode of a mixture of electrochemically active and electronically conductive materials and a negative electrode (an anode).

USE - As a battery cell (claimed). Used for electrochemistry and battery technology, e.g. for portable electronic devices.

ADVANTAGE - The device enhances the cycle life and shelf life of lithium-metal batteries. The battery has reduced voltage delay after initiation of battery discharge. The ternary alloy increases lithium cycling efficiency and **anode** stability towards electrolyte components during storage of the cell.

DESCRIPTION OF DRAWING(S) - The figure shows a block diagram illustrating the formation of an aluminum-lithium alloy on a lithium metal foil **surface**.

Electrode 100

Anode 120, 130

Dwg.1/8

FS CPI EPI

FA AB; GI

MC CPI: A12-E06A; L03-E01B5; L03-E01B5B; M11-A

EPI: X16-B01F1; X16-E01C

L109 ANSWER 3 OF 18 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN

AN 2003-103051 [09] WPIX

DNN N2003-082369 DNC C2003-025884

TI **Electrode** for rechargeable lithium battery, includes surface coating layer provided on **surface** of active material layer.

DC L03 X16

IN KAMINO, M; OHSHITA, R; TAMURA, N

PA (SAOL) SANYO ELECTRIC CO LTD; (KAMI-I) KAMINO M; (OHSH-I) OHSHITA R; (TAMU-I) TAMURA N

CYC 2

PI US 2002168572 A1 20021114 (200309)* 6p H01M004-40 <--
JP 2002289178 A 20021004 (200309) 6p H01M004-02 <--

ADT US 2002168572 A1 US 2002-103127 20020322; JP 2002289178 A JP 2001-84761
20010323

PRAI JP 2001-84761 20010323

IC ICM H01M004-02; H01M004-40
ICS H01M004-04; H01M004-38; H01M004-66;
H01M010-40

AB US2002168572 A UPAB: 20030206

NOVELTY - An electrode includes **surface** coating layer that is

provided on a surface of active material layer, opposite to the surface on which the current collector layer is provided. The surface coating is composed of metal or metal alloy incapable or capable of alloying with lithium.

DETAILED DESCRIPTION - An electrode comprises current collector layer provided with active material layer. The current collector layer is composed of metal incapable of alloying with lithium and the active material layer is composed of metal capable of alloying with lithium. A surface coating layer is provided on a surface of active material layer, opposite to the surface on which the current collector layer is provided. The surface coating is composed of metal or metal alloy incapable or capable of alloying with lithium.

An INDEPENDENT CLAIM is included for a rechargeable lithium battery including negative electrode, positive electrode and nonaqueous electrolyte (2).

USE - For rechargeable lithium battery.

ADVANTAGE - The electrode exhibits improved charge-discharge characteristics. The presence of the surface coating layer prevents a reaction of electrolyte and surface of active material layer, thus suppressing deterioration of active material layer at its surface and improving charge-discharge cycle characteristics.

DESCRIPTION OF DRAWING(S) - The drawing shows a schematic sectional view of a beaker cell.

Nonaqueous electrolyte 2

Dwg.2/2

FS CPI EPI

FA AB; GI

MC CPI: L03-E01B5; L03-E01B8

EPI: X16-E01C; X16-E02

L109 ANSWER 4 OF 18 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN

AN 2002-436022 [46] WPIX

CR 1996-268819 [27]; 1997-558117 [51]; 1998-446053 [38]; 1998-541733 [46];
1999-302578 [25]; 2000-181181 [16]; 2000-222629 [19]; 2001-090475 [10];
2001-581771 [65]; 2003-361779 [34]

DNN N2002-343229 DNC C2002-123910

TI Anode for electrochemical cell comprises lithium metal layer, and metal-lithium alloy layer.

DC L03 X16

IN CHU, M; NIMON, Y S; VISCO, S J

PA (POLY-N) POLYPLUS BATTERY CO; (POLY-N) POLYPLUS BATTERY CO INC

CYC 97

PI WO 2002041416 A2 20020523 (200246)* EN 44p H01M004-02 <--
RW: AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW MZ
NL OA PT SD SE SL SZ TR TZ UG ZW

W: AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CO CR CU CZ DE DK
DM DZ EC EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR
KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ PH PL PT RO
RU SD SE SG SI SK SL TJ TM TR TT TZ UA UG US UZ VN YU ZA ZW

AU 2002011410 A 20020527 (200261) H01M004-02 <--

US 6537701 B1 20030325 (200325) H01M004-58 <--

ADT WO 2002041416 A2 WO 2001-US31019 20011003; AU 2002011410 A AU 2002-11410
20011003; US 6537701 B1 Cont of US 1998-148024 19980903, CIP of US
2000-480286 20000110, US 2000-713997 20001115

FDT AU 2002011410 A Based on WO 2002041416; US 6537701 B1 Cont of US 6017651,
CIP of US 6165644

PRAI US 2000-713997 20001115; US 1998-148024 19980903; US 2000-480286
20000110

IC ICM H01M004-02; H01M004-58

ICS H01M004-04; H01M010-40

AB WO 200241416 A UPAB: 20030723

NOVELTY - An **anode** comprises a **lithium** metal layer, and metal-lithium alloy layer. The metal-lithium alloy layer increases the **lithium** cycling efficiency and **anode** stability towards electrolyte components during storage of electrochemical cell.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are included for the following:

(a) An electrochemical cell or a battery cell comprising a positive electrode comprising electrochemically active material and electronically conductive material, a negative electrode or **anode** (100, 120, 130) comprising **lithium** layer with metal-lithium alloy layer, and an electrolyte solution (110);

(b) A method of forming a **lithium** **anode** with metal-lithium alloy layer (106) including **depositing a metal layer** on an outer **surface** of the lithium foil, alloying the lithium foil and metal layer on outer **surface** of lithium foil to form a metal-lithium layer, and forming a **surface coating** (108) on metal-lithium alloy layer.

USE - For electrochemical cell e.g., battery cell.

ADVANTAGE - The inventive anode includes a **surface coating** that is effective to increase **lithium** cycling efficiency and **anode** stability towards electrolyte during storage of electrochemical cell. It is capable of providing batteries having improved cycle life, increased shelf-life, and reduced voltage delay after initiation of battery discharge.

DESCRIPTION OF DRAWING(S) - The drawing shows a block diagram of the formation of aluminum-lithium alloy on the **surface** of the lithium foil.

Anode 100, 120, 130

Metal-lithium alloy layer 106

Surface coating 108

Electrolyte solution 110

Dwg.1/8

FS CPI EPI

FA AB; GI

MC CPI: L03-E01B5B

EPI: X16-B01F; X16-E01

L109 ANSWER 5 OF 18 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN

AN 2002-291269 [33] WPIX

CR 2001-432627 [46]; 2001-475660 [51]

DNN N2002-227418 DNC C2002-085390

TI Anode formation for primary, secondary electrochemical cell, involves **depositing active layer** comprising lithium metal (foil) and multi-layer structure of single ion conducting layers and polymer layers on **substrate**.

DC A85 L03 P42 X16

IN AFFINITO, J; MIKHAYLIK, Y V; SHEEHAN, C J; SKOTHEIM, T A

PA (AFFI-I) AFFINITO J; (MIKH-I) MIKHAYLIK Y V; (SHEE-I) SHEEHAN C J; (SKOT-I) SKOTHEIM T A; (MOLT-N) MOLTECH CORP

CYC 97

PI US 2002012846 A1 20020131 (200233)* 22p H01M004-40 <--

WO 2002095849 A2 20021128 (200280) EN H01M004-04 <--

RW: AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW MZ

NL OA PT SD SE SL SZ TR TZ UG ZM ZW

W: AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CO CR CU CZ DE DK

DM DZ EC EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR

KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ PL PT RO RU

SD SE SG SI SK SL TJ TM TR TT TZ UA UG US UZ VN YU ZA ZW
 ADT US 2002012846 A1 Provisional US 1999-167171P 19991123, CIP of US
 2000-721519 20001121, CIP of US 2000-721578 20001121, US 2001-864890
 20010523; WO 2002095849 A2 WO 2002-US16649 20020523
 PRAI US 1999-167171P 19991123; US 2000-721519 20001121; US 2000-721578
 20001121; US 2001-864890 20010523
 IC ICM H01M004-04; H01M004-40
 ICS B05D005-12; H01M004-66
 AB US2002012846 A UPAB: 20021212
 NOVELTY - Anode is formed by **depositing active layer**
 (10) comprising lithium metal or lithium metal foil and multi-layer
 structure (21) comprising 3 or more layers selected from single ion
 conducting layers (40,41) and polymer layers (30) on **substrate**.
 Structure (21) is formed by depositing polymer or a single ion conducting
 layer on layer (10) followed by deposition of another two layers
based on preset condition.

DETAILED DESCRIPTION - Anode is formed by **depositing active layer** (10) comprising lithium metal or a lithium metal foil and multi-layer structure (21) comprising three or more layers selected from single ion conducting layers (40,41) and polymer layers (30) on a **substrate**. Structure (21) is formed by depositing a first polymer or a single ion conducting layer on layer (10) followed by **deposition of second layer** comprising a single ion conducting layer if the first layer is a polymer, or a polymer layer if the first layer is a single ion conducting layer. A third layer comprising a single ion conducting layer if the second layer is a polymer, or a polymer layer if the second layer is a single ion conducting layer is **deposited subsequently** to form the anode.

USE - For primary and secondary electrochemical cell

ADVANTAGE - The electrochemical cell prepared using the anode favorable cycle characteristics.

DESCRIPTION OF DRAWING(S) - The figure shows a sectional view of the anode.

Lithium metal layer 10

Multi-layer structure 21

Polymer layer 30

Single ion conducting layer 40,41

Dwg.1/8

FS CPI EPI GMPI

FA AB; GI

MC CPI: A11-B05; A12-E06A; L03-E01B5B

EPI: X16-A02A; X16-B01F1; X16-E03A1; X16-E08A

L109 ANSWER 6 OF 18 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN

AN 2001-455987 [49] WPIX

DNC C2001-137716

TI Method of manufacturing **electrodes** for lithium secondary cell.

DC A85 L03 X16

IN CHOI, S G; PARK, C G; WALTER WAVNER, C G

PA (SKCS-N) SKC CO LTD

CYC 1

PI KR 2001001828 A 20010105 (200149)* 1p H01M004-64 <--

ADT KR 2001001828 A KR 1999-21294 19990609

PRAI KR 1999-21294 19990609

IC ICM H01M004-64

AB KR2001001828 A UPAB: 20010831

NOVELTY - An **electrode** manufacturing method for a lithium secondary cell is provided to enhance adhering force between a current collecting layer and an activating layer while

protecting a deposited metal layer from damage.

DETAILED DESCRIPTION - An electrode for a lithium secondary cell is manufacture by compounding a current collecting material with an electrode active material. A carbon or plastic fiber mesh deposited with a conductive metal is used. The carbon or plastic fiber mesh is used as coated with a conductive metal. The surface of the current collecting material is coated for a pretreatment with a slurry in which a binder resin and conductive particles are dispersed into an organic solvent. The plastic fiber includes polyethylene, polypropylene and polyester. The conductive metal includes copper, aluminum, nickel or stainless steel. The conductive metal coating can be performed via a vacuum deposition.

Dwg.1/10

FS CPI EPI
 FA AB; GI
 MC CPI: A04-G02E4; A04-G03E; A05-E01B3; A11-B05D; A11-C04B1; A12-E06A;
 A12-S05X; L03-E01B5
 EPI: X16-E08A

L109 ANSWER 7 OF 18 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN

AN 2001-432627 [46] WPIX

CR 2001-475660 [51]; 2002-291269 [33]

DNN N2001-320590 DNC C2001-130876

TI Preparation of anode of electrochemical cell includes depositing temporary protective metal layer on lithium metal layer.

DC A85 L03 X16

IN MIKHAYLIK, Y V; SHEEHAN, C J; SKOTHEIM, T A

PA (MOLT-N) MOLTECH CORP

CYC 95

PI WO 2001039303 A1 20010531 (200146)* EN 41p H01M004-02 <--
 RW: AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW MZ
 NL OA PT SD SE SL SZ TR TZ UG ZW
 W: AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CR CU CZ DE DK DM
 DZ EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC
 LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ PL PT RO RU SD SE
 SG SI SK SL TJ TM TR TT TZ UA UG US UZ VN YU ZA ZW
 AU 2001017967 A 20010604 (200153) H01M004-02 <--
 EP 1234348 A1 20020828 (200264) EN H01M004-02 <--
 R: AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT
 RO SE SI

KR 2002059780 A 20020713 (200306) H01M004-02 <--

KR 2002059781 A 20020713 (200306) H01M004-02 <--

JP 2003515893 W 20030507 (200331) 44p H01M004-02 <--

CN 1415123 A 20030430 (200351) H01M004-02 <--

ADT WO 2001039303 A1 WO 2000-US32234 20001121; AU 2001017967 A AU 2001-17967
 20001121; EP 1234348 A1 EP 2000-980746 20001121, WO 2000-US32234 20001121;
 KR 2002059780 A KR 2002-706625 20020523; KR 2002059781 A KR 2002-706627
 20020523; JP 2003515893 W WO 2000-US32234 20001121, JP 2001-540870
 20001121; CN 1415123 A CN 2000-818173 20001121

FDT AU 2001017967 A Based on WO 2001039303; EP 1234348 A1 Based on WO
 2001039303; JP 2003515893 W Based on WO 2001039303

PRAI US 1999-167171P 19991123

IC ICM H01M004-02

ICS H01M002-16; H01M004-04; H01M004-60;
 H01M004-66; H01M006-16; H01M010-40

AB WO 2001039303 A UPAB: 20030808

NOVELTY - An anode of an electrochemical cell is prepared by depositing into a substrate a lithium metal layer, and depositing on the lithium metal layer a temporary protective metal

layer. The temporary protective metal is capable of forming an alloy with lithium metal or is capable of diffusing into the lithium metal.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for:

(A) the anode;

(B) an electrochemical cell comprising a cathode comprising a cathode active material, the anode and a non-aqueous electrolyte interposed between the anode and the cathode; and

(C) formation of an electrochemical cell.

USE - Used in an electrochemical cell.

ADVANTAGE - The process allows increased ease of fabrication of cells, and produces cells with long life cycle and high energy density.

Dwg.0/0

FS CPI EPI

FA AB

MC CPI: A12-E06A; A12-E09; L03-E01B5

EPI: X16-E01C; X16-E08A

L109 ANSWER 8 OF 18 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN

AN 2000-465395 [40] WPIX

DNN N2000-347414 DNC C2000-140054

TI Multilayer electric current producing cell preparing method involves pressing multilayered subassembly of anode, separator and cathode to form prismatic subassembly.

DC A85 L03 X16

IN DODDS, C S; GERNOV, Y M; KANTO, E V; SKOTHEIM, T A; THIBAULT, W C; GERONOV, Y M

PA (MOLT-N) MOLTECH CORP; (DODD-I) DODDS C S; (GERN-I) GERNOV Y M; (KANT-I) KANTO E V; (SKOT-I) SKOTHEIM T A; (THIB-I) THIBAULT W C

CYC 89

PI WO 2000036678 A2 20000622 (200040)* EN 76p H01M006-04

RW: AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW NL
OA PT SD SE SL SZ TZ UG ZW

W: AL AM AT AU AZ BA BB BG BR BY CA CH CN CR CU CZ DE DK DM EE ES FI
GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS LT
LU LV MA MD MG MK MN MW MX NO NZ PL PT RO RU SD SE SG SI SK SL TJ
TM TR TT TZ UA UG US UZ VN YU ZA ZW

AU 2000021935 A 20000703 (200046) H01M006-04

US 6190426 B1 20010220 (200112) H01M010-38

US 2001003863 A1 20010621 (200137) H01M010-04

ADT WO 2000036678 A2 WO 1999-US30133 19991216; AU 2000021935 A AU 2000-21935
19991216; US 6190426 B1 US 1998-215030 19981217; US 2001003863 A1 Div ex
US 1998-215030 19981217, US 2001-771079 20010125

FDT AU 2000021935 A Based on WO 2000036678; US 2001003863 A1 Div ex US 6190426

PRAI US 1998-215030 19981217; US 2001-771079 20010125

IC ICM H01M006-04; H01M010-04; H01M010-38

ICS H01M004-40; H01M004-58

AB WO 200036678 A UPAB: 20000823

NOVELTY - A separator (6) is interposed between an anode having a lithium active material and a solid composite cathode. This arrangement is wound on a mandrel to form a rounded anode separator-solid composite subassembly. The mandrel is then removed and the subassembly pressed to form a prismatic subassembly. After removing it is contacted with the lithium salt electrolyte to form a cell stack.

DETAILED DESCRIPTION - The cell stack is then enclosed in a barrier metal film and seated to form a casing. The film is a laminar combination of anode, separator and solid composite cathode comprising cathode active material. The cathode has two opposing surface and non-permeable current collector in contact with one surface of cathode active layer. The anode and cathode active layer are positioned in face to face relationship. The laminar combination is wound on a round mandrel having a

circumference selected preferably from length of 140-200% or 150-195% or 160-190% of difference between external length dimension and external thickness dimension of prismatic cell stack. Anode and **cathode** tabs are attached to lithium metal layer of **anode** active layer and current collector of composite cathode. The laminar combination is wound to form a rounded shaped anode separator solid composite cathode subassembly having a jelly roll configuration. After compressing the cell stack it is sealed in a film to form a casing. The rounded subassembly is shaped into a form that is intermediate between rounded shape and prismatic shape. The intermediate form comprises a pre-fold edge. The anode tabs and cathode tabs are extended from the prismatic cell stack to the casing in an electrically insulated relationship with respect to each other and to casing. The extensions of lithium metal layer are placed in electrical contact by ultrasonic welding. The anode and cathode comprises a non-permeable current collector which comprises conductive layer selected from a group consisting of conductive metals, coatings comprising conductive metal pigments, conductive carbons and conductive metal oxide pigments. The conductive layer of non-permeable current collector is in contact with an insulating layer. A **metallic layer is deposited** in electrical contact with the conductive layer at all anode contact edges, by metal screen. The conductive metal foil of current collector of cathode extends beyond the corresponding edges of anode and separator to form a conductive coil extension and all the extensions are placed in an electrical contact by ultrasonic welding. The prismatic subassembly of battery is formed by pressing the rounded subassembly in a press. The pressure is preferably in the range of 100-6000 kPa or 200-5000 kPa or 200-3500 kPa. The prismatic subassembly is contacted with the source of liquid non-aqueous lithium salt electrolyte to form prismatic cell stack utilizing a vacuum back fill procedure. The procedure involves placing the prismatic subassembly in a container, subjecting the container to vacuum for specific time, contacting the subassembly with electrolyte and continuing contacting of subassembly for total time period. The total period is preferably in the range of 0.01-50 hours or 0.02-25 hours or 0.02-2 hours and/or 0.01-50 hours. During formation of the prismatic cell stack, a strip of material is wound around the circumference assembly to maintain two substantially parallel flat surfaces. Before packing the stack the material is removed and excess electrolyte on outer surface of cell stack is also removed. An INDEPENDENT CLAIM is also included for multilayered electric current producing cell comprising a casing and prismatic cell stack comprising anode, cathode and separator in between, the area of the anode active layer is greater than or equal to 1000 cm². The ratio of the area of the anode active layer to the volume of cell stack is greater than 60 cm⁻¹

USE - For production of prismatic cells that generates an electric current.

ADVANTAGE - Since excess amount of electrolyte introduced into the prismatic cell is reduced, the mechanical stress that damage the multilayers of prismatic cell is also reduced.

DESCRIPTION OF DRAWING(S) - The figure shows the mandrel shape and jelly roll configuration of a prismatic cell.
separator 6

cathode active layer 8

non-permeable cathode current collector 10

mandrel 24

anode-separator-solid composite cathode subassembly 50

anode 52

Dwg.4/10

FS CPI EPI

FA AB; GI

MC CPI: A12-E06A; L03-E02; L03-E03
EPI: X16-A02A; X16-B01F1; X16-E01C; X16-F02

L109 ANSWER 9 OF 18 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN
AN 2000-072273 [06] WPIX
DNN N2000-056559 DNC C2000-020606
TI Fabrication of active metal electrode used as negative electrodes
in batteries such as lithium electrodes in
lithium-sulfur batteries.
DC A85 L03 X16
IN TSANG, F Y; VISCO, S J
PA (POLY-N) POLYPLUS BATTERY CO; (POLY-N) POLYPLUS BATTERY CO INC; (POLY-N)
POLYPLUS BATTERY CO LTD
CYC 86
PI WO 9957770 A1 19991111 (200006)* EN 33p H01M004-02 <--
RW: AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW NL
OA PT SD SE SL SZ UG ZW
W: AL AM AT AU AZ BA BB BG BR BY CA CH CN CU CZ DE DK EE ES FI GB GD
GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS LT LU LV
MD MG MK MN MW MX NO NZ PL PT RO RU SD SE SG SI SK SL TJ TM TR TT
UA UG US UZ VN YU ZA ZW
AU 9933713 A 19991123 (200016) H01M004-04 <--
US 6214061 B1 20010410 (200122) H01M004-02 <--
EP 1093672 A1 20010425 (200124) EN H01M004-02 <--
R: AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT
RO SE SI
BR 9910109 A 20011009 (200168) H01M004-02 <--
KR 2001043145 A 20010525 (200168) H01M004-02 <--
MX 2000010743 A1 20010401 (200171) H01M010-40
CN 1307731 A 20010808 (200173) H01M004-02 <--
AU 745287 B 20020321 (200233) H01M004-02 <--
JP 2002513991 W 20020514 (200236) 40p H01M004-04 <--
US 6432584 B1 20020813 (200255) H01M004-08 <--
ADT WO 9957770 A1 WO 1999-US6895 19990329; AU 9933713 A AU 1999-33713
19990329; US 6214061 B1 Provisional US 1998-83947P 19980501, US
1998-139601 19980825; EP 1093672 A1 EP 1999-915119 19990329, WO
1999-US6895 19990329; BR 9910109 A BR 1999-10109 19990329, WO 1999-US6895
19990329; KR 2001043145 A KR 2000-712042 20001030; MX 2000010743 A1 MX
2000-10743 20001101; CN 1307731 A CN 1999-808029 19990329; AU 745287 B AU
1999-33713 19990329; JP 2002513991 W WO 1999-US6895 19990329, JP
2000-547661 19990329; US 6432584 B1 Provisional US 1998-83947P 19980501,
Cont of US 1998-139601 19980825, US 2000-678063 20001002
FDT AU 9933713 A Based on WO 9957770; EP 1093672 A1 Based on WO 9957770; BR
9910109 A Based on WO 9957770; AU 745287 B Previous Publ. AU 9933713,
Based on WO 9957770; JP 2002513991 W Based on WO 9957770
PRAI US 1998-139601 19980825; US 1998-83947P 19980501; US 2000-678063
20001002
IC ICM H01M004-02; H01M004-04; H01M004-08;
H01M010-40
ICS H01M004-40
AB WO 9957770 A UPAB: 20000203
NOVELTY - A glassy or amorphous protective layer impervious and conductive
to active metal ions is formed on a substrate. A first active
metal layer is deposited on the protective
layer and a current collector (208) is provided on the first active metal
layer, forming an active metal electrode.
DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for the
following:
(i) a battery comprising the active metal electrode;
(ii) a partially fabricated battery cell essentially consisting of a

current collector, a glassy or amorphous protective layer, an active metal layer provided between the current collector and the protective layer and a gel or solid electrolyte provided on the protective layer; and
(iii) a battery cell comprising the partially fabricated battery cell.

USE - Used as **lithium electrodes** in **lithium-sulfur batteries** (claimed), negative **electrodes** for primary batteries such as lithium manganese dioxide batteries, lithium (CF)_X batteries, lithium thionyl chloride batteries, lithium sulfur dioxide batteries, lithium iron sulfide batteries (Li/FeS₂), lithium polyaniline batteries and lithium iodine batteries, secondary batteries such as lithium-sulfur batteries, lithium cobalt oxide batteries, lithium nickel oxide batteries, lithium manganese oxide batteries and lithium vanadium oxide batteries, other rechargeable batteries employing active metals other than lithium. Also used as negative **electrodes** and electrode-electrolyte laminates, solid state electrolyte separators such as sodium beta-alumina glass or ceramic, polymeric electrolytes, porous membranes etc.

ADVANTAGE - The protective layer on the negative electrode prevents the positive and negative electrodes from contacting one another and serves the function of separator. The protective layer is tough, thick and made from a material that resists cracking and abrasion. A high quality protective layer which is smooth, continuous and free of pores or defects is provided on the **substrate**. The protective layer is chemically stable to the electrolyte within the voltage window of the cell and is conductive to lithium ion. The protective layer is impervious to moisture, carbon dioxide, oxygen and the **lithium electrode** can be handled under ambient conditions without the need of dry box conditions as typically employed to process other **lithium electrodes**. The protective layer provides a good protection for the lithium and imparts long shelf life of the **electrode** and electrolyte composites. The **lithium metal electrode** manufactured has a longer cycle life and better safety characteristics. The protective layer formed on the **substrate** prevents formation of dendrites and mossy deposits. The batteries having the active metal electrode does not require a carbon intercalation matrix to support lithium ions. The batteries possess a high energy density than a conventional lithium ion cell. The lithium metal batteries do not have a large irreversible capacity loss associated with the formation of lithium ion batteries. The battery cells obtained using the active electrode is rechargeable.

DESCRIPTION OF DRAWING(S) - The figure shows the schematic illustration of a **lithium electrode**.

partially fabricated lithium **electrode** 200
current collector laminate 202
current collector 208
electrolyte laminate; 254
electrolyte layer 256
glass layer 258
web carrier 262
Dwg.2b/3

FS CPI EPI
FA AB; GI
MC CPI: A12-E06; L03-E01B5
EPI: X16-A02A; X16-B01F1; X16-E03A1; X16-E08A

L109 ANSWER 10 OF 18 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN
AN 1999-302534 [25] WPIX
DNN N1999-226665 DNC C1999-088691
TI Formation of vanadium oxide film on **substrate** used as

cathode in lithium-ion battery.

DC E12 E31 L03 X16

IN BENSON, D K; LIU, P; TRACY, C E; TURNER, J A; ZHANG, J

PA (MIDE) MIDWEST RES INST; (BENS-I) BENSON D K; (LIUP-I) LIU P; (TRAC-I) TRACY C E; (TURN-I) TURNER J A; (ZHAN-I) ZHANG J

CYC 79

PI WO 9919534 A1 19990422 (199925)* EN 29p C23C016-40
 RW: AT BE CH CY DE DK ES FI FR GB GR IE IT LU MC NL PT SE
 W: AL AM AT AU AZ BA BB BG BR BY CA CH CN CU CZ DE DK EE ES FI GB GE
 GH GM HR HU ID IL IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MD MG
 MK MN MW MX NO NZ PL PT RO RU SD SE SG SI SK SL TJ TM TR TT UA UG
 UZ VN YU ZW

AU 9910772 A 19990503 (199937) C23C016-40

US 6156395 A 20001205 (200066) C23C016-40

US 2003022065 A1 20030130 (200311) H01M004-48 <--

ADT WO 9919534 A1 WO 1998-US21434 19981009; AU 9910772 A AU 1999-10772
 19981009; US 6156395 A Cont of US 1997-948832 19971010, US 1999-325146
 19990603; US 2003022065 A1 Cont of US 1997-948832 19971010, Div ex US
 1999-325146 19990603, Div ex US 2000-715531 20001117, US 2002-180861
 20021004

FDT AU 9910772 A Based on WO 9919534; US 2003022065 A1 Div ex US 6156395

PRAI US 1997-948832 19971010; US 1999-325146 19990603; US 2000-715531
 20001117; US 2002-180861 20021004

IC ICM C23C016-40; H01M004-48

ICS C01G031-02

AB WO 9919534 A UPAB: 20011203
 NOVELTY - Process comprises forming a feed gas of vanadium-containing precursor with inert gas, oxygen and hydrogen under specified conditions, feeding to reaction chamber containing substrate, generating RF plasma within the chamber and continuously removing the by-produced gas.
 DETAILED DESCRIPTION - Formation of a vanadium oxide film on a substrate used as a cathode in a lithium-ion battery using a plasma enhanced chemical vapor deposition, comprises:
 (i) positioning a substrate within the plasma reaction chamber at room temperature;
 (ii) forming a precursor gas of a reactive, vanadium-containing precursor in an inert carrier gas and maintaining at -23 to 127 deg. C and 1-760 torr;
 (iii) forming a feed gas mixture by combining the precursor gas with oxygen gas and hydrogen gas, and flowing into reaction chamber, the precursor gas, oxygen gas and hydrogen gas having predetermined flow rates;
 (iv) generating an RF plasma within the reaction chamber to effect a chemical reaction to effect a chemical reaction to cause deposition of a vanadium oxide film and formation of a by-product gas at room temperature, the predetermined flow rate of hydrogen gas being sufficient to provide hydrogen gas for reacting with the vanadium-containing precursor to form the vanadium oxide film without reducing the vanadium oxide film; and
 (v) continuously removing the by-product gas from the chamber.
 USE - Used for forming a cathode in a lithium-ion battery using a plasma enhanced chemical vapor deposition.
 ADVANTAGE - The vanadium oxide thin-film layer has high charge capacity and cyclic stability. Process is economic process for producing vanadium oxide thin-films for specific use in lithium rechargeable batteries. The deposition rates of these film is higher than previously but films are produced with high charge/discharge, high stability and high energy density.
 DESCRIPTION OF DRAWING(S) - Figure 1 is a schematic of a PECVD system for forming vanadium oxide thin films.

PECVD System 10
Reaction Chamber 12
RF Plasma 14
Pump 16
Lower Plate 18
Substrate 20
Vanadium Oxide Film 22
Upper Plate 24
Control Panel 26
Reactive Precursor Source 28
Inert Carrier Gas Source 30
Flow Regulator Valve 32
Precursor Gas 34
Temperature Controller 36
Oxygen Gas Source 38
Flow Regulator Valve(42) Oxygen Gas 40
Hydrogen Gas Source 44
Flow Regulator Valve 46
Hydrogen Gas 48
Dwg.1/8
FS CPI EPI
FA AB; GI; DCN
MC CPI: E35-N; L03-E01B5
EPI: X16-E08A

L109 ANSWER 11 OF 18 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN
AN 1997-542129 [50] WPIX
DNN N1997-451462 DNC C1997-173218
TI **Lithium** secondary battery - has **cathode** active material coating layer in which occlusion/release of lithium ion is possible, on nickel coating which is deposited over **copper** (alloy) base material.
DC L03 X16
PA (FJIC) FUJI ELECTROCHEMICAL CO LTD
CYC 1
PI JP 09259866 A 19971003 (199750)* 5p H01M004-02 <--
ADT JP 09259866 A JP 1996-59796 19960315
PRAI JP 1996-59796 19960315
IC ICM H01M004-02
ICS H01M004-66; H01M010-40
AB JP 09259866 A UPAB: 19971217
The battery has a sheet like anode and cathode (2,4) separated by a separator (6) which together constitutes an electrode group (8) is placed inside a cathode side can (10). A non aqueous electrolyte (12) is injected into the can which has a gasket (14) at the opening edge. Then, the can is sealed with a anode plate (16). The cathode has a **nickel deposit** over a base material made of copper or a copper **alloy**. The **nickel deposit** is **coated** with a cathode active material layer in which occlusion/release of lithium ions is possible.

ADVANTAGE - Improves capacitance/maintenance property of battery. Prevents alloy formation in base material when active material layer occludes lithium ion on negative electrode material coating.

Dwg.1/3

FS CPI EPI
FA AB; GI
MC CPI: L03-E01B5
EPI: X16-E08A

L109 ANSWER 12 OF 18 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN
 AN 1994-326186 [41] WPIX
 DNC C1994-148292
 TI **Electrode**, pref. for a secondary lithium cell -
 comprises a support having a plastic network **substrate** with open
 cells with a metal layer on the network **surface** and a supported
 active material.
 DC A85 L03 M13
 IN IKEDA, H; KUBO, M; OKUDA, J
 PA (UEMU) UEMURA & CO LTD C; (UEMU) UEMURA KOGYO KK
 CYC 9
 PI EP 621648 A2 19941026 (199441)* EN 13p H01M004-80 <--
 R: CH DE FR GB IT LI NL
 JP 06349481 A 19941222 (199510) 7p H01M004-02 <--
 US 5434024 A 19950718 (199534) 11p H01M004-72 <--
 EP 621648 A3 19950524 (199546) H01M004-80 <--
 EP 621648 B1 19990331 (199917) EN H01M004-80 <--
 R: DE FR GB IT
 DE 69324238 E 19990506 (199924) H01M004-80 <--
 JP 3427435 B2 20030714 (200347) 7p H01M004-02 <--
 ADT EP 621648 A2 EP 1993-305937 19930727; JP 06349481 A JP 1993-228172
 19930820; US 5434024 A US 1993-93921 19930721; EP 621648 A3 EP 1993-305937
 19930727; EP 621648 B1 EP 1993-305937 19930727; DE 69324238 E DE
 1993-624238 19930727, EP 1993-305937 19930727; JP 3427435 B2 JP
 1993-228172 19930820
 FDT DE 69324238 E Based on EP 621648; JP 3427435 B2 Previous Publ. JP 06349481
 PRAI JP 1993-111105 19930414
 REP DE 2017702; DE 3919570; EP 151064; EP 392082; GB 115961; GB 762670
 IC ICM H01M004-02; H01M004-72; H01M004-80
 ICS C23C014-00; C23C014-04; C23C014-20; C23C014-32; C25B011-03;
 H01M004-66; H01M010-40
 AB EP 621648 A UPAB: 19941206
 In an embodiment, the plastic network **substrate** is removed. The
 metal **layer** is pref. **deposited** by vapour phase
 plating, esp. arc ion plating. A prefd. metal is Al. Secondary cell
 includes the above electrode as positive electrode.
 In an example Al is arc ion plated onto a polyurethane foam plate of
 thickness 2 mm at pressure 10 -4 torr, arc current 100 AH and time 20
 mins. A 10 micron Al film covers the entire foam lattice **surface**
 . The lattice may then be filled with an active mixt. of e.g. MnO₂, Li,
 PVA and C powder.
 ADVANTAGE - Electrode support structure provides good adhesion to
 active material and uses low amts. of conductive material and binder,
 resulting in improved cell charge/discharge performance.
 Dwg. 0/9
 FS CPI
 FA AB; GI
 MC CPI: A12-E06A; L03-E01B5; M13-F03

L109 ANSWER 13 OF 18 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN
 AN 1992-164076 [20] WPIX
 DNN N2000-041807 DNC C2000-014059
 TI Non-aqueous electrolyte secondary battery for communication apparatus -
 has anode obtained by coating anode active material at specific portions
 of **metal deposition film** formed on plastic
substrate.
 DC L03 X16
 PA (MITQ) MITSUBISHI ELECTRIC CORP
 CYC 1
 PI JP 04104478 A 19920406 (199220)* 4p

JP 2987178 B2 19991206 (200005)B 3p H01M010-40
ADT JP 04104478 A JP 1990-222066 19900821; JP 2987178 B2 JP 1990-222066
19900821
FDT JP 2987178 B2 Previous Publ. JP 04104478
PRAI JP 1990-222066 19900821
IC H01M004-02; H01M010-40
ICM H01M010-40
ICS H01M002-34; H01M004-02
AB JP 2987178 B UPAB: 20000128 AB EQ treated as Basic
NOVELTY - A cathode plate (6) made of lithium and a
rechargeable anode plate are wound with a separator (4)
inbetween. The anode plate is a plastic substrate (1) with
metal deposition film (2) on one side. Anode
active material (3) is coated on the film at specific portions by fixed
pattern.

USE - For power supply in communication apparatus.

ADVANTAGE - Generation of short circuit is eliminated. Capacity and
charging-discharging cycle are improved. DESCRIPTION OF DRAWING(S) - The
figure shows principal portion of battery. (1) Plastic substrate
; (2) Metal deposition film; (3) Anode
active material; (4) Separator; (6) Cathode plate.

Dwg.1/3

AB JP 04104478 A UPAB: 20000228
NOVELTY - A cathode plate (6) made of lithium and a
rechargeable anode plate are wound with a separator (4)
inbetween. The anode plate is a plastic substrate (1) with
metal deposition film (2) on one side. Anode
active material (3) is coated on the film at specific portions by fixed
pattern.

USE - For power supply in communication apparatus.

ADVANTAGE - Generation of short circuit is eliminated. Capacity and
charging-discharging cycle are improved. DESCRIPTION OF DRAWING(S) - The
figure shows principal portion of battery. (1) Plastic substrate
; (2) Metal deposition film; (3) Anode
active material; (4) Separator; (6) Cathode plate.

Dwg.1/3

FS CPI EPI
FA AB; GI
MC CPI: L03-E01B; L03-E03
EPI: X16-B01F1; X16-E01

L109 ANSWER 14 OF 18 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN
AN 1990-190371 [25] WPIX

TI Lithium secondary battery - has cathode consisting of
graphite layer deposited on iron
substrate NoAbstract Dwg 1/3.

DC L03 X16
PA (SHAF) SHARP KK
CYC 1
PI JP 02126573 A 19900515 (199025)*
ADT JP 02126573 A JP 1988-280870 19881107
PRAI JP 1988-280870 19881107
IC H01M004-02; H01M010-40
FS CPI EPI
FA NOAB; GI
MC CPI: L03-E01B3
EPI: X16-B01X

L109 ANSWER 15 OF 18 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN
AN 1989-009856 [02] WPIX

DNN N1989-007521 DNC C1989-004567
 TI Assembling constituents of electrochemical generator - based on thin films of lithium or its alloy and of polymeric electrolyte.
 DC A85 L03 P51 P73 X16
 IN BELANGER, A; GAUTHIER, M
 PA (HYDR-N) HYDRO QUEBEC; (ERAP) SOC NAT ELF AQUITAINE; (HYDR-N) HYDRO-QUEBEC
 CYC 16
 PI EP 298801 A 19890111 (198902)* FR 7p
 R: AT BE CH DE ES FR GB GR IT LI LU NL SE
 WO 8810517 A 19881229 (198903) FR
 W: JP US
 FR 2616971 A 19881223 (198907)
 JP 01503661 W 19891207 (199004)
 US 4897917 A 19900206 (199012) 6p
 EP 298801 B 19920318 (199212) 8p
 R: AT BE CH DE ES FR GB IT LI LU NL SE
 DE 3869243 G 19920423 (199218)
 ES 2031256 T3 19921201 (199301) H01M004-02 <--
 CA 1326261 C 19940118 (199409) FR H01M004-02 <--
 JP 2839520 B2 19981216 (199904) 6p H01M006-18
 ADT EP 298801 A EP 1988-401494 19880616; WO 8810517 A WO 1986-FR313 19860616;
 FR 2616971 A FR 1987-8542 19870618; JP 01503661 W JP 1989-505446 19890217;
 US 4897917 A US 1988-218243 19880713; EP 298801 B EP 1988-401494 19880616;
 ES 2031256 T3 EP 1988-401494 19880616; CA 1326261 C CA 1988-569784
 19880617; JP 2839520 B2 JP 1988-505446 19880616, WO 1988-FR313 19880616
 FDT ES 2031256 T3 Based on EP 298801; JP 2839520 B2 Previous Publ. JP
 01503661, Based on WO 8810517
 PRAI FR 1987-8542 19870618
 REP 2.Jnl.Ref; EP 13199; EP 143566; EP 146245; EP 147929; GB 2148586; JP
 60049573; US 4621035
 IC ICM H01M004-02; H01M006-18
 ICS B21B009-00; B32B007-06; H01M004-12; H01M010-38
 AB EP 298801 A UPAB: 19930923
 The constituents, comprising thin film negative **electrode**
 based on Li or Li alloy and component
 comprising at least one thin film of a polymeric electrolyte conductive
 through Li ions, are assembled by (1) using as precursor for the negative
 electrode an intermediary assembly formed from thin film of Li or Li alloy
 supported on film of inert plastic material having adhesion to Li such to
 allow manipulation of the intermediary assembly but less than that of the
 Li-based film to the solid polymeric electrolyte; (2) applying
 free metallic face of intermediary assembly to the polymeric electrolyte
 at temp. and under pressure such that Li of intermediary assembly adheres
 to the electrolyte. Opt. the plastic film with Li is sep'd. partly or
 completely by peeling.
 ADVANTAGE - Thin Li film-based negative
 electrode is more readily handled, positioned, and aligned.
 O/O
 FS CPI EPI GMPI
 FA AB
 MC CPI: A12-E09; L03-E01C
 EPI: X16-A02A; X16-E03
 L109 ANSWER 16 OF 18 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN
 AN 1987-208461 [30] WPIX
 TI Long life alloy **electrode base** for lithium
 storage battery - comprises aluminium film deposited
 on iridium or tin sheet NoAbstract NoDwg.
 DC L03 X16
 PA (KAOS) KAO CORP

CYC 1
PI JP 62031950 A 19870210 (198730)*
ADT JP 62031950 A JP 1985-169512 19850731
PRAI JP 1985-169512 19850731
IC H01M004-40
FS CPI EPI
FA NOAB
MC CPI: L03-E01B8
EPI: X16-B01X; X16-E01

L109 ANSWER 17 OF 18 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN
AN 1984-088432 [14] WPIX
DNN N1984-066106 DNC C1984-037702
TI Current collector for sulphide contg. positive electrode - for electrochemical cell, has **surface** reacting with sulphur at cell voltage.
DC L03 X16 X21
IN BARTHOLME, L G; SHIMOTAKE, H
PA (USAT) US DEPT ENERGY
CYC 1
PI US 424112 A0 19840103 (198414)* 17p
US 4440837 A 19840403 (198416)
ADT US 424112 A0 US 1982-424112 19820927
PRAI US 1982-424112 19820927
IC H01M004-52; H01M006-36
AB US N6424112 N UPAB: 20011211

The current collector consists of a **base** metal of Cu, Ag, Au, Al or alloys, coated with Fe, Ni, Cr or alloys. When subjected to cell voltages, an S-contg. cpd. forms at the current collector **surface** protecting it from further S attack during operation. The cell is of the type having e.g. an Fe sulphide positive electrode; a negative **electrode**, e.g. Li-Al alloy; and a molten salt electrolyte contg. alkali and/or alkaline earth metal halides, e.g. LiCl-KCl eutectic, contacting positive and negative electrodes.

The high temp. sec. cells are useful for e.g. electric automobiles, energy storage. The collector provides low cell resistance and uniform current distribution throughout the cycle, even for electrode areas exceeding 35 in.2/side, e.g. 150 in.2/side. Cells using the collector (Fe collector) had specific power at 50% discharge 89(83)W/kg and specific energy 79.3 (73.1) V hr./ kg.

Dwg.0/1

FS CPI EPI
FA AB
MC CPI: L03-E01B
EPI: X16-E02; X21-B01

L109 ANSWER 18 OF 18 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN
AN 1978-46623A [26] WPIX
TI Lattice for lead storage battery electrode - made of lead **alloy** with lithium **deposited** on and diffused into **surface** layers.
DC L03 M26 X16
PA (MATU) MATSUSHITA ELEC IND CO LTD
CYC 1
PI JP 53055745 A 19780520 (197826)*
PRAI JP 1976-130761 19761029
IC H01M004-68
AB JP 53055745 A UPAB: 19930901
The lattice for a lead storage battery exhibits excellent self discharge rate and improved service life at overdischarge cycle.

R. Alejandro

10/079,003

09/11/2003

For example, an alloy comprising 4.5 wt.% Sb, 0.3 wt.% As and balance Pb, or an alloy comprising 0.1 wt.% Ca and balance Pb is used. Li is vacuum deposited on the surface of the Pb alloy lattice at approx. 900 degrees C under reduced pressure to a thickness of 0.1-0.3 mu. The lattice is then heated at approx. 250 degrees C for approx. 15 min. in an inert gas to promote the dispersion of Li into the Pb alloy lattice body. Suitable paste-like active material is adhered to the lattice by conventional methods to form a Pb electrode.

FS CPI EPI

FA AB

MC CPI: L03-E01B1; M26-B04